

# **EXHIBIT A**

**UNITED STATES DISTRICT COURT  
DISTRICT OF NEW JERSEY**

IN RE ALLERGAN GENERIC DRUG	)	
PRICING SECURITIES LITIGATION	)	Civil Action No. 2:16-9449
	)	(KSH) (CLW)
	)	

**EXPERT REPORT OF CHAD COFFMAN, CFA**

March 20, 2020

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## I. INTRODUCTION

1. I, Chad Coffman, am the President of Global Economics Group, a Chicago-based firm that specializes in the application of economics, finance, statistics, and valuation principles to questions that arise in a variety of contexts, including, as here, in the context of litigation. I have been asked by counsel for the Plaintiffs in this matter to examine and opine on whether the markets for Allergan plc's, ("Allergan," "Actavis,"<sup>1</sup> or the "Company") publicly traded securities were efficient during the period from October 29, 2013 through November 2, 2016, inclusive ("Class Period").<sup>2</sup> The Allergan publicly traded securities (collectively, "Allergan Securities") I have been asked to consider include Allergan common stock ("Allergan Common Stock" or "Common Stock") and Allergan's 5.50% Mandatory Convertible Preferred Shares, Series A ("Allergan Preferred Stock" or "Preferred Stock").

2. In addition, I have been asked to opine on whether calculating damages in this matter is subject to a common methodology under Section 10(b) of the Securities Exchange Act of 1934 (the "Exchange Act") and SEC Rule 10b-5 adopted thereunder (collectively "Section 10(b)"). Plaintiffs also have separate claims under Section 14(a) of the Exchange Act, and Rule 14a-9 promulgated thereunder for the shares received by Investors in accordance with the Forest

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<sup>1</sup> Allergan was known as Actavis plc prior to its acquisition of Allergan, Inc. The acquisition was completed on March 17, 2015, and the combined company changed its name to Allergan plc on June 15, 2015. See, Allergan plc SEC Form 10-K for the Fiscal Year-End December 31, 2015 p. 3.

<sup>2</sup> Allergan Preferred Stock was issued on 2/24/2015 and 2/25/2015 was the first day of trading data. Thus, in regard to Allergan Preferred Stock, the Analysis Period refers to 2/25/2015 through 11/2/2016 (which is a subset of the Class Period).

Acquisition<sup>3</sup> and the Actavis Acquisition<sup>4</sup> (collectively, “the Acquisitions”).<sup>5</sup> I was also asked to explain and demonstrate the method for computing damages under Section 14(a) of the Exchange Act related to these acquisitions.

3. The materials I have considered in forming my opinions are summarized in **Appendix A**. Global Economics Group is being compensated at an hourly rate of \$750 per hour for my work on this matter, and at rates between \$170 and \$450 for members of my staff who performed work in connection with this report under my direction and supervision. My compensation is in no way contingent on the outcome of this case. My qualifications are described below.

## **II. QUALIFICATIONS**

4. I hold a Bachelor’s Degree in Economics with Honors from Knox College and a Master’s of Public Policy from the University of Chicago. I am also a CFA charter-holder. The CFA, or Chartered Financial Analyst, designation is awarded to those who have sufficient practical experience and complete a rigorous series of three examinations over three years that cover a wide variety of financial topics including financial statement analysis and valuation.

5. I, along with several others, founded Global Economics Group on March 25, 2008.<sup>6</sup> Prior to starting Global Economics Group, I was employed by Chicago Partners LLC for over twelve years where I was responsible for conducting and managing analysis in a wide variety of

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<sup>3</sup> “On July 1, 2014, Actavis plc acquired Forest Laboratories, Inc. (the “Forest Acquisition”). Under the terms of the transaction, Forest shareholders received 89.8 million Company Ordinary Shares...” Actavis plc Form 10-K for the Fiscal Year-End December 31, 2015, p. 8.

<sup>4</sup> “On March 17, 2015, Actavis plc acquired Allergan, Inc. (the “Allergan Acquisition”). Under the terms of the agreement, Allergan shareholders received 111.2 million Actavis plc ordinary shares...” Actavis plc Form 10-K for the Fiscal Year-End December 31, 2015, p. 3.

<sup>5</sup> Complaint ¶¶ 288-316.

<sup>6</sup> Prior to March 16, 2011, Global Economics Group was known as Winnemac Consulting, LLC.

areas, including securities valuation and damages, labor discrimination, and antitrust. I have been engaged numerous times as a valuation expert both within and outside the litigation context. My experience in class action securities cases includes work for plaintiffs, defendants, D&O insurers, and a prominent mediator (Retired Judge Daniel Weinstein) to provide economic analysis and opinions in dozens of securities class actions, as well as other matters. As a result of my involvement in these cases, much of my career has been spent analyzing and making inferences about how quickly and reliably, and to what degree, new information impacts securities prices.

6. My qualifications are further detailed in my curriculum vitae, which is attached as **Appendix B**.

### **III. SUMMARY OF OPINIONS**

7. After analyzing Allergan Securities during the Class Period and giving careful consideration to the efficiency factors described in detail throughout this report, I have formed the opinion that the markets for Allergan Securities were efficient during the Class Period. I have also formed the opinion that damages for both the Section 10(b) claims and the Section 14(a) claims can be calculated on a class-wide basis. These opinions are based upon my analysis described in the remaining sections of this report.

8. The remainder of this report is organized as follows: **Section IV** of this report provides an overview of Allergan's business operations and the allegations in this case. **Section V** discusses the reliance requirement for the claims under Section 10(b) of the Exchange Act and the "fraud on the market" theory. **Section VI** introduces the *Cammer* factors and other factors that financial economists and courts apply when evaluating market efficiency under the "fraud on the market" theory. **Section VII** provides the results of my empirical evaluation of each

*Cammer* factor and other factors for the Allergan Securities during the Class Period. **Section VIII** addresses how damages under Section 10(b) and Section 14(a) in this matter are subject to a common approach and methodology that can be applied class-wide.

9. I reserve the right to amend this report, including to reflect new information that becomes available to me in light of the discovery process and/or future rulings from the Court.

#### **IV. OVERVIEW OF THE COMPANY AND ALLEGATIONS**

10. Allergan plc (previously known as Actavis plc) is incorporated in Ireland and headquartered in Dublin, Ireland. During the Class Period, the Company's Common Stock traded on the New York Stock Exchange ("NYSE") under the ticker "ACT" prior to June 15, 2015, and under the ticker "AGN" thereafter.<sup>7</sup> Beginning on February 25, 2015, Allergan's Preferred Stock traded on the NYSE under the ticker "ACTPRA" prior to June 15, 2015, and under the ticker "AGNPRA" thereafter."<sup>8</sup> Allergan describes its business, in part, as follows:

Allergan plc is a global specialty pharmaceutical company engaged in the development, manufacturing, marketing, and distribution of brand name pharmaceutical products ("brand", "branded" or "specialty brand"), medical aesthetics, biosimilar and over-the-counter ("OTC") pharmaceutical products. The Company has operations in more than 100 countries.<sup>9</sup>

11. Prior to the Teva Agreement, Allergan's business also included:

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<sup>7</sup> On June 15, 2015 Actavis plc changed its name to Allergan plc and changed its ticker from ACT to AGN. *See* Allergan plc SEC Form 10-K for the Fiscal Year-End December 31, 2015, p. 3.

<sup>8</sup> Allergan plc SEC Form 424(b)(2) Supplement filed February 25, 2015 and Allergan plc SEC Form 10-K for the Fiscal Year-End December 31, 2015, p. 3.

In Section VII.F.2. I will define preferred stock in general terms, as well as describe the specific details of Allergan Preferred Stock.

<sup>9</sup> Allergan plc. SEC Form 10-K for the Fiscal Year-End December 31, 2015, p. 4.

[G]eneric product development, manufacturing and distribution of off-patent pharmaceutical products, established international brands marketed similar to generic products and out-licensed generic pharmaceutical products...<sup>10</sup>

12. During the Class Period, Allergan underwent several acquisitions, was the potential target to be acquired, and divested a substantial portion of its business. These events altered the makeup of the company as well as what information would be considered relevant by market participants; in Section VII below, I describe in detail how my analysis accounts for these shifts.

I have identified the following dates which I refer to as Corporate Action Events:

- February 18, 2014: Actavis announced an agreement to acquire Forest Laboratories.<sup>11</sup>
- July 1, 2014: Actavis completed its acquisition of Forest Laboratories.<sup>12</sup>
- November 17, 2014: Actavis entered into a definitive agreement to acquire Allergan, Inc.<sup>13</sup>
- March 17, 2015: Actavis completed its acquisition of Allergan, Inc.<sup>14</sup> The combined company changed its name to Allergan plc on June 15, 2015.<sup>15</sup>
- July 27, 2015: Allergan announced the sale of its global generics business to Teva Pharmaceuticals.<sup>16</sup>

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<sup>10</sup> Allergan plc. SEC Form 10-K for the Fiscal Year-End December 31, 2015, pp. 3-4. ("On July 26, 2015, Allergan plc entered into a master purchase agreement (the "Teva Agreement"), under which Teva Pharmaceutical Industries Ltd. ("Teva") agreed to acquire the Company's global generic pharmaceuticals business and certain other assets...")

<sup>11</sup> "(PR) Actavis to Acquire Forest Laboratories, Inc. for \$25 Billion in an Equity and Cash Transaction," *PR Newswire*, February 18, 2014, 7:01 AM EST.

<sup>12</sup> "Actavis Completes Forest Laboratories Acquisition," *PR Newswire*, July 1, 2014, 8:20 AM EST.

<sup>13</sup> "Actavis to Acquire Allergan to Create Top 10 Global Growth Pharmaceutical Company with \$23 Billion in Revenue," *PR Newswire*, November 17, 2014, 9:15 AM EST.

<sup>14</sup> "Actavis Completes Allergan Acquisition," *PR Newswire*, March 17, 2015, 8:55 AM EST.

<sup>15</sup> Allergan plc SEC Form 10-K for the Fiscal Year-End December 31, 2015, p. 3.

<sup>16</sup> See "Allergan Accelerates Transformation to Branded Growth Pharma Leader by Divesting Global Generics Business to Teva for \$40.5 Billion," *PR Newswire*, July 27, 2015, 4:37 AM EST. The agreement was reached on



- October 29, 2015: Allergan confirmed preliminary friendly discussions with Pfizer regarding a potential business combination transaction.<sup>17</sup>
- April 6, 2016: Allergan and Pfizer terminated its merger agreement in response to actions taken by the U.S. Department of Treasury to make tax inversions less financially appealing.<sup>18</sup>
- August 2, 2016: Allergan completed the sale of its generics business to Teva Pharmaceuticals.<sup>19</sup>

13. Plaintiffs' Complaint alleges that Allergan issued false and misleading statements and omitted material information during the Class Period and in connection with the Forest and Actavis Acquisitions, ultimately causing damages to investors who unknowingly purchased or acquired Allergan Securities at artificially inflated prices and were damaged when the market prices ultimately reflected the concealed information.<sup>20</sup>

14. More specifically, the Complaint claims, among other things, that Allergan participated in a generic pharmaceutical price-fixing scheme which is under investigation by Congress, the DOJ, and state Attorneys Generals.<sup>21</sup> The Plaintiffs assert Allergan conspired with competitors at industry conferences and through private communications to drive up generic

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July 26, 2015, and announced the next business day, on July 27, 2015, *see*, Allergan plc. SEC Form 10-K for the Fiscal Year-End December 31, 2015, p. 3.

<sup>17</sup> "Allergan plc Confirms Discussions Regarding Potential Business Combination Transaction With Pfizer Inc.," *PR Newswire*, October 29, 2015, 9:30 AM EST.

<sup>18</sup> "Allergan Reiterates Strong Standalone Growth Profile and Strategy Following Termination of Pfizer Transaction," *PR Newswire*, April 6, 2016 6:45 AM EST.

<sup>19</sup> "Allergan plc Completes Divestiture of Global Generics Business to Teva Pharmaceuticals," *PR Newswire*, August 2, 2016, 12:41 PM EST.

<sup>20</sup> *See* Complaint, generally.

<sup>21</sup> Complaint ¶¶ 2; 12-25; 171-193.

drug prices, eventually attracting governmental attention and investigation.<sup>22</sup> The Complaint alleges that the relevant truth was revealed to the markets through a series of partial corrective disclosures, upon which news the prices of Allergan Securities fell, harming investors who bought shares at inflated prices.<sup>23</sup>

15. In addition, the Complaint asserts that Allergan investors who received shares from the Acquisitions were harmed due to the misrepresentations and omissions in the relevant proxy statements, preventing those investors from making informed votes regarding the Acquisitions. Thus, when the truth was revealed to the market, the price of Allergan Common Stock fell, harming the investors who received shares as a result of the Acquisitions.<sup>24</sup>

## **V. DISCUSSION OF RELIANCE ELEMENT**

16. Class members' reliance on the alleged misstatements and material omissions is a required element for Plaintiffs' Section 10(b) claims.<sup>25</sup> Plaintiffs assert that they and members of the Class relied on the fraudulent statements when purchasing Allergan Securities.<sup>26</sup> This claim is in accordance with the "fraud on the market" theory of reliance. The "fraud on the market" theory is based on the fact that in an efficient market (one in which widely-available public information is quickly incorporated into the market price of a security), all purchasers implicitly rely on any material misrepresentations or omissions since the value of those misrepresentations

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<sup>22</sup> Complaint ¶¶ 83-105; 113; 116; 129; 146; 171-179.

<sup>23</sup> Complaint ¶¶ 15-17; 234-242.

<sup>24</sup> Complaint ¶¶ 288-316.

<sup>25</sup> It is my understanding that reliance is not a required element for Plaintiffs' Section 14(a) claims. *See In re Heckmann Corp. Sec. Litig.*, No. 10-378-LPS-MPT, 2013 WL 2456104, at \*10 (D. Del. June 6, 2013) ("Unlike a claim for a violation under § 10(b), to recover damages under § 14(a) of the Securities Exchange Act, plaintiff need not prove reliance because it is not an element of the claim.").

<sup>26</sup> Complaint ¶ 279.

or omissions is incorporated into each class member's purchase price. The "fraud on the market" theory was first addressed by the U.S. Supreme Court in *Basic Inc. v. Levinson*:

...[I]n an open and developed securities market, the price of a company's stock is determined by the available material information regarding the company and its business...Misleading statements will therefore defraud purchasers of stock even if the purchasers do not directly rely on the misstatements...The causal connection between the defendants' fraud and the plaintiffs' purchase of stock in such a case is no less significant than in a case of direct reliance on misrepresentations.<sup>27</sup>

17. The Supreme Court reaffirmed this theory in *Halliburton II*:

More than 25 years ago, we held that plaintiffs could satisfy the reliance element of the Rule 10b-5 cause of action by invoking a presumption that a public, material misrepresentation will distort the price of stock traded in an efficient market, and that anyone who purchases the stock at the market price may be considered to have done so in reliance on the misrepresentation. We adhere to that decision and decline to modify the prerequisites for invoking the presumption of reliance.<sup>28</sup>

18. As indicated in *Basic* and reaffirmed in *Halliburton II*, in an open, developed and efficient market, market prices reflect what is known about a company. If a company provides the market with misleading information regarding its financial strength or business practices, the market price will be inflated (or deflated) compared to what the price would have been if the truth were known (but-for misleading information). Thus, in an efficient market, where the plaintiff asserts there were material misrepresentations or omissions, all purchasers implicitly relied on those misrepresentations and/or lack of disclosure by paying the inflated (or deflated) price.

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<sup>27</sup> *Basic Inc., v. Levinson*, 485 U.S. 224 (1988) ("*Basic*"), 241-42.

<sup>28</sup> *Halliburton Co., et al., v. Erica P. John Fund, Inc.*, 134 S. Ct. 2398, 2418 (2014) ("*Halliburton II*").

19. Determining whether the market for a security was “open and developed” or “efficient” to the degree required for a presumption of reliance under the “fraud on the market” theory is an empirical exercise.<sup>29</sup> The esteemed economist Dr. Eugene Fama, in his seminal research, first outlined definitions of an “efficient market.”<sup>30</sup> He described different levels of efficiency which he called “weak-form,” “semi-strong-form,” and “strong-form” efficiency.<sup>31</sup>

20. The market efficiency standard adopted by *Basic* and reaffirmed by *Halliburton II* as necessary for the presumption of reliance conforms most closely with Dr. Fama’s “semi-strong form” efficiency. “Semi-strong form” efficiency implies that all publicly available information is reflected in a security’s current market price. This implies that security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. *Basic* stated: “In an open and developed securities market, the price of a company’s stock is determined by the available material information regarding the company and its business.”<sup>32</sup> The Supreme Court’s effective adoption of the “semi-strong form” efficiency standard is economically sensible because it recognizes that insiders often possess non-public information and that securities prices do not

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<sup>29</sup> To recognize the presumption of reliance, the Court explained, was not “conclusively to adopt any particular theory professionals generally consider most publicly announced material statements about companies, thereby affecting stock market prices.” *Basic*, n.24. *Basic*’s presumption of reliance thus does not rest on a “binary” view of market efficiency, but rather, market efficiency is a matter of degree.

<sup>30</sup> Fama, E., Efficient Capital Markets: A Review of Theory and Empirical Work, 25 J. FIN. 383 (1970).

<sup>31</sup> “Weak-form” efficiency requires that historical prices are not predictive of future prices. Under this form of efficiency, excess returns cannot be earned using strategies based on historical prices. Therefore, technical analysis will not produce consistent excess returns over time. “Semi-strong form” efficiency implies that all public information is reflected in a stock’s current market price. Security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. Under this form of efficiency, neither fundamental nor technical analysis can produce consistent excess returns. “Strong-form” efficiency implies all information in the market, whether public or private, is accounted for in the market price. In this market, investors cannot consistently earn excess returns over a long period of time even if they have inside information.

<sup>32</sup> *Basic*, 241.

necessarily reflect this non-public information, but that to presume reliance, the market price must reflect publicly available information.

21. In the next section, I explain the factors that are regularly considered by financial economists and courts in determining whether the markets for these particular securities were efficient.

## **VI. CAMMER FACTORS**

22. In *Cammer v. Bloom*, the court identified the following factors as relevant to the determination of whether an efficient market exists for a given security: 1) average weekly trading volume, 2) analyst coverage, 3) market makers, 4) SEC Form S-3 eligibility, and 5) price reaction to unexpected information.<sup>33</sup>

23. The *Cammer* decision relied on Bromberg & Lowenfels' definition of efficiency. As articulated below, the adopted definition of efficiency is consistent with Fama's definition of "semi-strong" efficiency. For the purposes of this exercise, I adopt Bromberg & Lowenfels' definitions for the terms "open," "developed," and "efficient" as described below:

*An open market* is one in which anyone, or at least a large number of persons, can buy or sell.

*A developed market* is one which has a relatively high level of activity and frequency, and for which trading information (e.g., price and volume) is widely available. It is principally a secondary market in outstanding securities. It usually, but not necessarily, has continuity and liquidity (the ability to absorb a reasonable amount of trading with relatively small price changes).

*An efficient market* is one which rapidly reflects new information in price.

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<sup>33</sup> *Cammer, et al., v. Bruce M. Bloom*, et al., 711 F. Supp. 1264 (D.N.J. 1989) ("*Cammer*").

These terms are cumulative in the sense that a developed market will almost always be an open one. And an efficient market will almost invariably be a developed one.<sup>34</sup>

24. While there is a well-accepted economic theory of market efficiency, there are no broadly accepted bright-line empirical tests that allow one to classify a particular market as “efficient” or “inefficient.” In my view, the *Cammer* decision identified important metrics to consider when evaluating efficiency for purposes of the “fraud on the market” theory.<sup>35</sup> I also consider a number of other factors that courts have utilized beyond the *Cammer* factors. However, since there are no bright-line tests for efficiency, it is important to consider the identified efficiency factors as a whole because none of the individual tests or metrics is determinative as to whether a particular market is efficient.

25. In the subsequent sections, I evaluate the markets for Allergan Securities during the Class Period under each of the *Cammer* factors, as well as the following additional factors that courts have also considered in assessing market efficiency: 1) market capitalization, 2) bid-ask spread, 3) the fraction of shares held by institutional investors, and 4) autocorrelation (meaning whether there is a pattern in a security’s returns so that future returns can be predicted based upon past returns), and 5) options trading.

## **VII. APPLICATION OF EFFICIENCY FACTORS TO ALLERGAN SECURITIES**

### **A. OVERVIEW**

26. After giving careful consideration to each of the efficiency factors described in detail below, I find that each factor supports the conclusion that the markets for Allergan

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<sup>34</sup> *Cammer*, 711 F. Supp. at 1276 n.17 (citing Bromberg & Lowenfels, 4 *Securities Fraud and Commodities Fraud*, § 8.6 (Aug. 1988) (“Bromberg & Lowenfels”)) (emphasis added).

<sup>35</sup> The use of the *Cammer* factors has been cited with approval in the Third Circuit. See *In re DVI, Inc. Sec. Litig.*, 639 F.3d 623, 634 n. 16 (3d Cir.2011); *City of Sterling Heights Gen. Employees' Ret. Sys. v. Prudential Fin., Inc.*, No. CIV.A. 12-5275, 2015 WL 5097883, at \*6 (D.N.J. Aug. 31, 2015).

Securities were efficient throughout the Class Period. In addition to the discussion below, **Exhibit 1** summarizes how, for each of the factors examined, the empirical evidence supports a finding that each of the Allergan Securities traded in an efficient market. **Exhibit 1** reflects that for certain factors there are separate empirical analyses for each of the Allergan Securities, while for other factors there is a single analysis that applies to Allergan Securities as a whole. For instance, *Cammer* Factor 2 deals with analyst coverage. Analyst reports disseminate value-relevant information about the financial prospects of the Company overall and their relevance is not limited to Allergan Common Stock.

27. As further background to my analyses, **Exhibit 2** and **Exhibit 2-P** display the closing price and trading volume for each day throughout the Class Period for Allergan Common Stock and Allergan Preferred Stock, respectively.<sup>36</sup> **Appendix C** provides background information and details on the terms of Allergan Preferred Stock.

28. In summary, and as discussed more fully below, Allergan Securities traded in efficient markets during the Class Period. First, the average weekly trading volume of all Allergan Securities during the Class Period far exceeded benchmarks that courts have established, and each of the Allergan Securities had an average weekly trading volume that exceeded the average security traded on the NYSE and the NASDAQ Exchange (“NASDAQ”).<sup>37</sup> Second, there were a substantial number of securities analysts following and reporting on Allergan. Third, Allergan Securities were actively traded on the NYSE, fulfilling the *Cammer* factor regarding market makers. Fourth, Allergan filed multiple SEC Forms S-3 during and

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<sup>36</sup> When referring to exhibits, exhibits labeled “P” refers to Allergan Preferred Stock. Exhibits labeled without a letter (with the exception of **Exhibit 4**, **Exhibit 15**, and **Exhibit 16**) reference Allergan Common Stock.

<sup>37</sup> As discussed below, the average weekly trading volume was 5.05% and 4.82% of shares outstanding for the Common Stock and Preferred Stock, respectively, during the Class Period. The average weekly trading volume for stocks trading on the NYSE and NASDAQ during the Class Period was 2.14%.

following the Class Period, and met the important eligibility criteria for filing a Form S-3 throughout the Class Period. Fifth, there was a strong cause-and-effect relationship between new Company-specific information and the market price of Allergan Securities during the Class Period. Sixth, Allergan Securities had large market capitalizations relative to all other firms that traded on the NYSE and NASDAQ. Seventh, Allergan Securities had low bid-ask spreads relative to other exchange-traded common stocks. Eighth, institutions, which are considered generally to be well-informed investors, held the vast majority of the public float of Allergan Common Stock.<sup>38</sup> Ninth, there is no evidence of consistent autocorrelation during the Class Period. Tenth, there was active trading in Allergan Common Stock options throughout the Class Period. My analyses of all of these factors support the conclusion that Allergan Securities traded in open, developed, and efficient markets throughout the Class Period.

**B. CAMMER FACTOR 1: AVERAGE WEEKLY TRADING VOLUME**

29. The first *Cammer* Factor is the average weekly trading volume of a security.

According to one authority cited by the *Cammer* court,

Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for the security is an efficient one; 1% would justify a substantial presumption.<sup>39</sup>

30. Volume as a fraction of shares outstanding is an important indicator of market efficiency. First, volume is objectively quantifiable and comparable across securities. Second, high volume is generally indicative of continuity, liquidity, and market depth – which are highly indicative of market efficiency.<sup>40</sup> Third, substantial volume would indicate there is likely a

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<sup>38</sup> Institutions also held the Preferred Stock.

<sup>39</sup> *Cammer*, 711 F. Supp. at 1293 (citing Bromberg & Lowenfels).

<sup>40</sup> Continuity means that trades may occur at any time. Liquidity in this context means that investors can convert cash into shares or shares into cash at a price similar to that of the prior trade (assuming no new information). Sharpe, W., Alexander, G., and Bailey, J., *Investments*, Prentice Hall, Fifth Edition, 1995, pp. 44-45.



market for the collection and distribution of information about the security. As Thomas and Cotter explain, “[t]rading volume was also considered as an eligibility standard because it affects information dissemination to the market, and was an important criterion for investment analysts in deciding which stocks to follow.”<sup>41</sup>

31. Allergan Common Stock easily surpasses the threshold level of average weekly trading volume necessary for an efficient market. The average weekly trading volume for Allergan Common Stock during the Class Period was 5.05% of shares outstanding, compared to 2.14% for the NYSE and NASDAQ. **Exhibit 3** plots Allergan Common Stock’s trading volume as a fraction of shares outstanding for each week during the Class Period.<sup>42</sup> The average weekly trading volume during the Class Period was 15.3 million shares. The volume of trading for Allergan Common Stock supports the conclusion that the market for this security was efficient throughout the Class Period.

32. Allergan Preferred Stock also easily surpasses the *Cammer* threshold. The average weekly turnover as a percentage of shares outstanding was 4.82% for Allergan Preferred Stock, compared to 2.14% for the NYSE and NASDAQ.<sup>43</sup> **Exhibit 3-P** plots Allergan Preferred Stock weekly trading volume as a fraction of shares outstanding and public float for each week during

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Bromberg and Lowenfels define a market that has continuity and liquidity as “the ability to absorb a reasonable amount of trading with relatively small price changes.” *Cammer*, 1276 n.17 (citing Bromberg & Lowenfels).

Market depth refers to “the number of shares that [can] be traded at the quoted bid and ask prices.” A deep market will have significant orders on the buy and sell side so that the market can experience a relatively large market order without greatly altering the market price. See Amihud, Y., et al., *Liquidity and Asset Prices*, 1 FOUND. & TRENDS FIN. 269 (2005), 317.

<sup>41</sup> Thomas, R., and Cotter, J., *Measuring Securities Market Efficiency in the Regulatory Setting*. 63 LAW & CONTEMP. PROBS. 105 (2000), 108. Randall S. Thomas is a Director of the Law and Business Program at Vanderbilt University. Dr. James Cotter is an Associate Professor of Finance at Wake Forest University.

<sup>42</sup> For the purposes of this analysis, a “trading week” consists of 5 consecutive trading days, which may not follow the calendar week.

<sup>43</sup> Note that Allergan Preferred Stock experienced 60% turnover during its first week of trading. Excluding this week, the average weekly turnover during the Class Period was 4.16%.

the Analysis Period.<sup>44</sup> The average weekly trading volume during the Analysis Period was 243.2 thousand shares.<sup>45</sup> The volume of trading for this security supports the conclusion that it was efficient during the Analysis Period.

33. Another way to measure trading volume is annualized turnover velocity, which is essentially the first *Cammer* factor measured in dollar terms.<sup>46</sup> To be more specific, instead of looking at shares traded divided by shares outstanding, turnover velocity is the dollar value of shares traded (*i.e.*, shares traded multiplied by price per share) divided by the dollar value of all shares outstanding (*i.e.*, shares outstanding multiplied by price per share). This is the same ratio because the numerator and denominator are multiplied by price per share. The advantage of this measure is that once quoted in annualized terms, Allergan Securities' turnover velocity can be compared directly with other publicly traded stocks based on exchange-reported statistics. For example, over the Class Period, the annualized turnover velocity ratios for Allergan Common Stock and Allergan Preferred Stock were 252.67% and 240.88%, respectively, compared with the NYSE and NASDAQ average of 111.78% for the Class Period.<sup>47</sup> Thus, Allergan Securities have annualized turnover velocity ratios that were substantially higher than the average stock trading on the NYSE and NASDAQ, further supporting that these securities traded in efficient markets.

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<sup>44</sup> For the purposes of this analysis, a "trading week" consists of 5 consecutive trading days, which may not follow the calendar week.

<sup>45</sup> Excluding its first week of trading, an average of 209.9 thousand Preferred shares traded weekly.

<sup>46</sup> Turnover velocity is simply the average trading volume as a percentage of shares outstanding (the first *Cammer* Factor), where both the numerator and denominator are expressed in dollar terms:

Turnover Velocity Ratio = (Volume x Price)/(Shares Outstanding x Price) = Dollars Traded/Dollars Outstanding.

<sup>47</sup> Turnover velocity for the NYSE and NASDAQ is calculated from data provided by the World Federation of Exchanges. See <https://www.world-exchanges.org/home/index.php/statistics/monthly-reports>.

34. In short, the relatively high trading volume in Allergan Securities throughout the Class Period supports the conclusion that the markets for Allergan Securities were efficient.

**C. CAMMER FACTOR 2: ANALYST COVERAGE**

35. The *Cammer* decision stated the following related to analyst coverage:

... [I]t would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors.<sup>48</sup>

36. Analyst coverage can be important evidence of efficiency. Significant analyst coverage implies that there is sufficient interest in a company and its securities, that there is an active market for information regarding the company and its securities, and that the information is widely distributed.

37. During the Class Period, there was continuous analyst coverage for Allergan. **Exhibit 4** shows that there were at least 1,004 equity analyst reports issued during the Class Period and shows that 41 separate firms had equity analysts issue reports on Allergan, including major firms such as RBC, UBS, JP Morgan, and Morgan Stanley.<sup>49</sup> These reports served the purpose of disseminating publicly available information along with commentary, news, updates, analyses, and recommendations of the analysts to investors. The extensive coverage of Allergan by securities analysts supports the conclusion that all Allergan Securities traded in efficient markets throughout the Class Period.<sup>50</sup>

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<sup>48</sup> *Cammer*, 711 F. Supp. at 1286.

<sup>49</sup> I obtained Allergan analyst reports from Investext. The number of analyst reports I identify is almost certainly understated since many reports are not available through third party data providers such as Investext. For example, it is clear that analysts from Goldman Sachs Group Inc., Bank of America, and Needham & Company, LLC, participated in earnings conference calls during the Class Period, but research reports from these analysts are not available via Investext. See, for example, Actavis plc Q1 2014 Earnings Call, April 30, 2014.

<sup>50</sup> Analyst reports covering Allergan Common Stock also provide relevant information for investors of the Preferred Shares. Even those reports that do not specifically mention the Preferred Shares directly provide relevant

38. Since 1989, when the *Cammer* decision was rendered, there has been a significant increase in alternative methods by which publicly available information about publicly-traded securities is disseminated to investors. For example, since the *Cammer* decision, through the Internet, 24-hour cable news networks, email, RSS feeds,<sup>51</sup> and other media, the ability of individual and institutional investors to obtain information about publicly-traded securities and the market in general has revolutionized the manner in which investors and investment professionals receive and process information.

39. Moreover, information regarding the market price, the current bid-ask spread, and the ability to trade online is available almost instantaneously via the Internet for anyone with an online brokerage account. Thus, in addition to the substantial analyst coverage of Allergan, there were many other sources of public information dissemination. For example, there was substantial public press regarding Allergan. A search for articles classified as related to Allergan by Factiva over the Class Period results in 12,581 unique articles (and 9,444 articles over the Analysis Period).<sup>52</sup> These news articles were identified according to the following sets of search terms applied over date ranges determined by the Corporate Action Events listed in Section IV:

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information to investors of the Preferred Shares since the value of Preferred Shares are related to the value of the Common Shares. See section “Event Study for Preferred Stock” for a more detailed description of the Preferred Shares and how its value relates to the value of the Common Stock.

<sup>51</sup> RSS is an acronym for Really Simple Syndication or Rich Site Summary. RSS files are formed as XML files and are designed to provide content summaries of news, blogs, forums or website content. The RSS feeds are generally simple headlines and brief descriptions; if the user is interested, the user can click to see additional information. Content viewed in the RSS reader or news aggregator is known as an RSS feed. RSS is becoming increasingly popular since it is a free and easy way to promote a site and its content without the need to advertise or create complicated content sharing partnerships (see <http://www.rss-specifications.com/>, and <http://www.rss-specifications.com/what-is-rss.htm>).

<sup>52</sup> Factiva is a business information and research tool owned by Dow Jones & Company. Factiva aggregates content from both licensed and free sources and provides organizations with search, alerting, dissemination, and other information management capabilities. The searches were performed within “Major News Sources,” and excluded titles that included “DIARY-S&P 500 EARNINGS MONTH AHEAD,” “DIARY - U.S. Company Conference Calls/Webcast for week ahead,” “DIARY-U.S. MEETINGS/WEEK AHEAD,” “DIARY - U.S. Company Conf Calls/Webcast for week ahead – II,” “DIARY-U.S. MEETINGS/WEEK AHEAD – II,” and “NYSE New 52-Week Highs And Lows.” Duplicate articles have been removed by a proprietary function accessible in Factiva’s search

- 10/29/2013 – 2/17/2014 (i.e., from the start of the Class Period, up until just before the announcement of Actavis’ agreement to acquire Forest Laboratories), I search for articles with company field “Allergan plc” or keyword field “Actavis”.<sup>53</sup>
- 2/18/2014 – 7/1/2014 (i.e., from the announcement of the Forest Laboratories acquisition through its completion date), I search for articles with company field “Allergan plc” or “Forest Laboratories” or keyword field “Actavis” or “Forest Laboratories”.
- 7/2/2014 – 11/16/2014 (i.e., after the completion of the Forest Laboratories acquisition but before the announcement of the Allergan, Inc. acquisition), I search for articles with company field “Allergan plc” or keyword field “Actavis”.
- 11/17/2014 – 3/17/2015 (i.e., from the Allergan, Inc. acquisition through its completion date), I search for articles with company field “Allergan plc” or “Allergan, Inc” or keyword field “Actavis” or “Allergan”.<sup>54</sup>
- 3/18/2015 – 10/28/2015 (i.e., after the completion of the Allergan, Inc. acquisition but before a potential transaction with Pfizer is announced), I searched for articles with company field “Allergan plc” or keyword field “Actavis” or “Allergan”.
- 10/29/2015 – 4/5/2016 (i.e., while the potential transaction with Pfizer is publicly known to be under consideration), I search for articles with company field “Allergan plc” or “Pfizer” or keyword field “Allergan” or “Pfizer”.

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builder. Since, Allergan Preferred Stock trading data begins February 25, 2015, articles found before this date are not included in the Analysis Period count.

<sup>53</sup> Note that Factiva’s “company field” is a permanent ID per company that refers to the same corporate entity and persists through name changes, so “Allergan plc” accurately refers to the correct corporate entity within Factiva’s system even when searching for news articles published on dates before the name change.

<sup>54</sup> Since, Allergan Preferred Stock trading data begins February 25, 2015, articles found before this date are not included in the Analysis Period count.

- 4/6/2016 – 11/2/2016 (i.e., starting when the potential transaction with Pfizer is abandoned, through the end of the Class Period), I search for articles with company field “Allergan plc” or keyword field “Allergan”.

40. In addition, there were numerous SEC filings available online in the SEC EDGAR database at no cost, as well as various other sources of public information available throughout the Class Period that I do not attempt to quantify. The degree of news coverage and publicly available information further supports the conclusion that there was substantial supply of, and demand for, information regarding Allergan in the public arena throughout the Class Period.

41. In summary, the number of analyst reports and the substantial public dissemination of news and other information regarding Allergan provide evidence of robust and active markets for public information about Allergan and evidence that its securities traded in efficient markets during the Class Period.

**D. CAMMER FACTOR 3: MARKET MAKERS**

42. A market maker is a firm that is ready to buy or sell a particular stock on a regular and continuous basis.<sup>55</sup> The third *Cammer* factor states:

For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption.<sup>56</sup>

43. The basic premise that the number of market makers can serve as an efficiency criterion relates to the notion that market makers are:

... [P]resumably knowledgeable about the issuing company and the stocks' supply and demand conditions (*i.e.*, the “order flow”). Therefore, it is believed the larger the number of market makers in a given security, the more

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<sup>55</sup> See <http://www.sec.gov/answers/mktmaker.htm>.

<sup>56</sup> *Cammer*, 711 F. Supp. at 1293.

information is available about it and the quicker its dissemination in the price.<sup>57</sup>

44. Allergan Securities are traded on the NYSE with continuous public price and volume reporting, as opposed to an over-the-counter market without volume reporting, which is the context in which *Cammer* indicated this was a relevant criterion.<sup>58</sup> On such over-the-counter markets, there may be reason for concern regarding liquidity and information dissemination. However, these concerns are generally not applicable to stocks trading on large, modern exchanges such as the NYSE and NASDAQ, which are presumed to be efficient, report volume and trade details, and tend to have rules that virtually guarantee a liquid market.<sup>59</sup>

45. The NYSE and NASDAQ are two of the largest and most liquid security exchanges in the world with billions of shares traded each day. Unlike over-the-counter markets that rely on decentralized market makers providing liquidity for trading, the NYSE and NASDAQ rely on a computerized system to match orders and provide quotes.<sup>60</sup> The minimum requirements to be listed on the NYSE or NASDAQ and remain in good standing virtually guarantee a liquid market for that security. Therefore, the number of “market makers” itself is not a particularly relevant metric in this case.

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<sup>57</sup> Barber, B., et al., The Fraud-on-the-Market Theory and the Indicators of Common Stocks’ Efficiency, 19 J. CORP. L. 285 (1994), 291.

<sup>58</sup> See *Cammer*, 711 F. Supp. at 1292, citing Bromberg & Lowenfels: “We think that, at a minimum, there should be a presumption – probably conditional for class determination – that certain markets are developed and efficient for virtually all the securities traded there: the New York and American Stock Exchanges, the Chicago Board Options Exchange and the NASDAQ National Market System.”

<sup>59</sup> For example, there are rules for minimal market capitalization and specialists are *required* to maintain an orderly market; see Sharpe, W., Alexander, G., and Bailey, J., *Investments*, Prentice Hall, Fifth Edition, 1995, pp. 45-53; Fabozzi, F., Modigliani, F., Jones, F., *Foundations of Financial Markets and Institutions*, Prentice Hall, Fourth Edition, 2010, Chapter 18 – Appendix A.

<sup>60</sup> For NYSE, see <https://www.nyse.com/market-model>. For NASDAQ, see <https://www.nasdaqtrader.com/Trader.aspx?id=TradingUSEquities>.

46. Nevertheless, according to Bloomberg, there were at least 173 market makers for Allergan Common Stock during the Class Period.<sup>61</sup> Therefore, Allergan Common Stock easily meets the letter and spirit of this factor, further supporting the efficiency of the market during the Class Period. Additionally, Allergan Preferred Stock traded on the NYSE throughout the Class Period. As discussed above, the market structure of the NYSE is supportive of the conclusion that the Preferred Stock traded in an efficient market. Based on the analysis above, this factor supports the efficiency of the markets for Allergan Securities during the Class Period.

**E. CAMMER FACTOR 4: SEC FORM S-3 ELIGIBILITY**

47. The fourth *Cammer* Factor is SEC Form S-3 eligibility, which states,

...[I]t would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency.<sup>62</sup>

48. Through use of a Form S-3, the SEC allows certain companies that have previously provided sufficiently high levels of public information to incorporate prior SEC filings by reference into current filings and not repeat the information, since it is already deemed to be widely publicly available.<sup>63</sup> In order to be eligible to issue a Form S-3, among other things, a company 1) must be subject to the Securities Exchange Act of 1934 reporting requirements for more than one year, 2) must have filed all documents in a timely manner for the past twelve months, and 3) must show that it has not failed to pay dividends or sinking funds nor defaulted

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<sup>61</sup> Bloomberg RANK function. Bloomberg only has RANK data for Allergan starting January 1, 2015.

<sup>62</sup> *Cammer*, 711 F. Supp. at 1287.

<sup>63</sup> For additional information, see [www.sec.gov/about/forms/forms-3.pdf](http://www.sec.gov/about/forms/forms-3.pdf).



on debts or material leases. Eligibility to file a Form S-3 is confirmatory evidence of efficiency, not a requirement. Interpreted in this way, the standard makes sense as an indicator of efficiency.

49. Based on the data available, Allergan was eligible to file Form S-3 throughout the Class Period. In fact, Allergan filed a Form S-3 during the Class Period (*on* August 1, 2014), a Form S-3ASR during the Class Period (*on* February 19, 2015), and a Form S-3ASR following the Class Period (*on* February 16, 2018).<sup>64</sup> Allergan therefore meets this *Cammer* efficiency factor, which supports the conclusion that Allergan Securities traded in efficient markets.

#### **F. CAMMER FACTOR 5: PRICE REACTION TO NEW INFORMATION**

50. The fifth *Cammer* Factor relates to how the price of a security reacts to new, company-specific information and states:

...[O]ne of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price.<sup>65</sup>

51. Establishing a causal connection between new company-specific events and movements in the market price is convincing evidence of market efficiency. A technique often relied upon, both inside and outside of the context of litigation, to establish such a causal connection is called an “event study.” An event study is a well-accepted statistical method utilized to isolate the impact of information on market prices.<sup>66</sup> Indeed, academics used event studies as one tool for evaluating the efficient market hypothesis in the first place. Event studies

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<sup>64</sup> <https://www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0001578845&type=S-3&dateb=&owner=exclude&count=40>.

<sup>65</sup> *Cammer*, 711 F. Supp. 1291.

<sup>66</sup> MacKinlay, A., *Event Studies in Economics and Finance*, 35 J. ECON. LITERATURE (1997), p. 13.

have been used for over 40 years and have appeared in hundreds if not thousands of academic articles as scientific evidence in evaluating how new information affects securities prices.<sup>67</sup>

52. An event study is a technique used to measure the effect of new information on the market prices of a company's publicly traded securities. New information may include, for example, company press releases, earnings reports, SEC filings, and news reports or analyst reports. An event study is conducted by specifying a model of expected price movements conditioned on outside market factors and then testing whether the deviation from expected price movements is sufficiently large that simple random movement can be rejected as the cause.

53. To analyze cause and effect, I performed event studies to determine whether Allergan Securities reacted to earnings announcements in a manner significantly different from how the stock moved on a random selection of days with no Allergan earnings announcements or pre-announcements. Based on the event studies I performed, which explicitly control for market and industry factors, I find that there are clear cause-and-effect relationships between new public information about Allergan and the market prices of Allergan Securities. I now describe in further detail the event study methodology, the events I tested, and the results.

54. A well-accepted method for performing an event study is to estimate a regression model over some period of time (an "estimation window") to observe the typical relationship between the market price of the relevant security and broad market factors.<sup>68</sup> I have performed such an analysis in this matter where I evaluate the relationship between Allergan Securities

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<sup>67</sup> Binder, J., *The Event Study Methodology Since 1969*, 11 REV. QUANTITATIVE FIN. & ACCT. (1998), p. 111.

<sup>68</sup> A "regression" or "regression model" is a statistical technique for measuring the ability of one or more variables (the "independent variables") to "explain" another variable of interest (the "dependent variable"). In this case, the daily percentage change in Allergan Common Stock (the Allergan daily return) is the dependent variable and the contemporaneous daily returns for the broad market and Peer Index are the independent variables. For a general discussion of regression analysis, see Gujarati, D., *Basic Econometrics*, Third Edition, McGraw Hill, 1995, Chapters 1-3.

daily returns (percentage change in price) controlling for the S&P 500 Total Return (the “Market Index”) and a Peer Index.<sup>69</sup>

## 1. EVENT STUDY FOR COMMON STOCK

55. During the Class Period, Allergan underwent several acquisitions, was the potential target to be acquired, and divested a substantial portion of its business. These events alter the makeup of the company, as well as what information would be considered relevant by market participants, and would also therefore potentially impact the return generating process (i.e. the relationship between Allergan Common Stock and the market and industry factors).<sup>70</sup> I therefore analyze Allergan Common stock using nine different estimation windows, demarcated by the Corporate Action Events described in Section IV. These windows are defined as follows:

- First estimation window: October 29, 2013 – February 17, 2014 (i.e., from the beginning of the Class Period, up to but not including the next Corporate Action Event)
- Second estimation window: February 18, 2014 – June 30, 2014 (i.e., from the announcement of the Forest Laboratories acquisition, up to but not including the next Corporate Action Event)

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<sup>69</sup> The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Class Period. Allergan compares its stock price performance to the Dow Jones US Pharmaceutical Index in its 10-Ks for the FYE 2013, 2014, 2015, and 2016. Companies while under merger consideration with Allergan are removed from the Peer Index. The returns of the Peer Index are net of the S&P 500 Total Return Index.

<sup>70</sup> See, Aktas, N., et al., *Event studies with a contaminated estimation period*, Journal of Corporate Finance. 13. (2007) (“In particular, unrelated events may be present during the chosen estimation window, which bias the estimation of the return-generating process parameters. A natural solution seems to be to choose, on a case-by-case basis, an estimation window free of such contaminating events...”).

- Third estimation window: July 1, 2014 – November 16, 2014 (i.e., from the completion of the Forest Laboratories acquisition, up to but not including the next Corporate Action Event)
- Fourth estimation window: November 17, 2014 – March 16, 2015 (i.e., the date Actavis entered into a definitive agreement to acquire Allergan, Inc., up to but not including the next Corporate Action Event)
- Fifth estimation window: March 17, 2015 – July 26, 2015 (i.e., the date Actavis completed its acquisition of Allergan Inc., up to but not including the next Corporate Action Event)
- Sixth estimation window: July 27, 2015 – October 28, 2015 (i.e., the day Allergan announced the sale of its global generics business to Teva Pharmaceuticals, up to but not including the next Corporate Action Event)
- Seventh estimation window: October 29, 2015 – April 5, 2016 (i.e., the date Allergan confirmed discussions with Pfizer regarding a potential transaction, up to but not including the next Corporate Action Event)
- Eighth estimation window: April 6, 2016 – August 1, 2016 (i.e., the date Allergan and Pfizer terminated its merger agreement, up to but not including the next Corporate Action Event)
- Ninth estimation window: August 2, 2016 – November 2, 2016, (i.e., the date Allergan completed the sale of its generics business to Teva Pharmaceuticals, through the end of the Class Period).

56. Within each of the nine estimation windows, I use all of the observed returns for the Company, the Market Index, and the Peer Index within that window to estimate my regression

model.<sup>71</sup> The results of that regression model are in turn applied to all days within the window, to assess the abnormal movement of Company Common Stock on each day.

57. The models for each estimation window indicate that there is a positive correlation between Allergan Common Stock and the control variables. In other words, the movement of the Market Index and Peer Index helps explain the price movements of Allergan Common Stock. For instance, choosing a day in the Class Period purely as an example, January 16, 2015, and looking at the regression results based on the fixed regression of that estimation window for that day, the estimated coefficient for the S&P 500 is 1.00, which means that a 1% rise in the S&P 500 predicts a 1.00% increase in returns for Allergan Common Stock. The estimated coefficient for the Peer Index is 0.68, meaning that the expected return for Allergan Common Stock is about a 0.68% increase for every 1% increase in the Peer Index over and above the return of the S&P 500. **Exhibit 5** plots the estimated coefficients for the regression models for each estimation window during the Class Period, and it demonstrates there was a consistently positive relationship between the general market, the Peer Index, and the price of Allergan Common Stock.

58. Another important statistic from the regression is the standard deviation of the errors, which measures the degree of imprecision in the predictions from the model. Put another way, this measure provides a metric for how much “randomness” remains in the price movement of Allergan Common Stock after controlling for the Market Index and Peer Index. For instance, on the example date, January 16, 2015, the model predicted that absent any new firm-specific

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<sup>71</sup> Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and certain outlier dates are not included in creating the model. The outlier dates include 11/18/2014, continued reaction to Actavis's acquisition announcement of Allergan; 7/27/2015, Teva announces agreement to purchase Allergan's generics business; and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

information, the price of Allergan Common Stock would increase by 2.06% because the S&P 500 was up 1.34% and the Peer Index was up 1.05%.<sup>72</sup> Because of the inherent randomness observed in stock price returns, I do not expect the model to predict returns exactly. In this example, I observe an actual return of 1.86%. Thus, the “abnormal return” for this day is -.20% (the actual return of 1.86% minus the predicted return of 2.06%). I then rely on the standard deviation of the errors from the regression model to tell if this abnormal return of -.20% is sufficiently large that I reject random movement as the explanation.

59. The test for whether randomness can be rejected is performed by calculating what is known as a “t-statistic,” which represents the number of standard deviations between the actual observation and the prediction. For the example date, an abnormal return of -.20% represents -0.19 standard deviations or a t-statistic of -0.19 (abnormal return of -.20% divided by the standard deviation of the errors of 0.0105). Using the standard assumption that, in the absence of new Company-specific news, abnormal returns will be normally distributed around zero, probability theory implies that based on randomness alone, using a 95% confidence level and large sample size, the abnormal return should have a t-statistic greater than 1.96 (or less than -1.96) only 5% of the time.<sup>73</sup> Stating this point another way, there is a 95% confidence that the

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<sup>72</sup> The expected return of 2.06% is found as follows:  $1.00 * 1.34\%$  (Coefficient on Market Index *times* Market Index return) +  $0.68 * 1.05\%$  (Coefficient on Peer Index Return *times* Peer Index Return) + 0.00% (constant term from the regression results).

<sup>73</sup> Tabak, D., and Dunbar, F., “Materiality and Magnitude: Event Studies in the Courtroom,” Ch. 19, *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, 2001. The financial economics literature often identifies the 90% threshold as a relevant boundary for significance as well. *See*, Tabak, D., and Dunbar, F., “Materiality and Magnitude: Event Studies in the Courtroom,” Ch. 19, *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, 2001, p. 9 (“It is not clear what level of statistical significance corresponds to a legal definition of materiality. As Mitchell and Netter point out, the 95% confidence level is commonly used, while the 90% and 99% levels are also options.”); Sahai, Hardeo and Mohammed I. Ageel, *The Analysis of Variance*, 2000, p. 599 (“The typical values of a confidence coefficient are 0.99, 0.95, and 0.90...”); and Mitchell, M., & Netter, J. (1994), “The Role of Financial Economics in Securities Fraud Cases: Applications at the Securities and Exchange Commission,” *The Business Lawyer*, 49(2), 545 – 590, p. 564 (“A third commonly used decision rule is ten percent – here, the probability is ten percent that a randomly selected value will lie 1.65 standard deviations or

actual return will fall within 1.96 standard deviations of the predicted return unless there is some non-random explanation. Since our example has a t-statistic of -0.19, the abnormal return is not statistically significant at the 95% confidence level, and I cannot reject randomness as the cause of the abnormal price movement with greater than 95% confidence. By contrast, if on a particular day one observes an abnormal return that has a t-statistic of a magnitude greater than 1.96 (statistically significant at the 95% confidence level) and one observes new firm-specific information, one would reject randomness as the explanation with 95% confidence and infer that the new information is the cause of the stock price movement.

60. **Exhibit 6** shows that the standard deviation of the errors for Allergan Common Stock varied over the Class Period across the different event windows.

61. To analyze cause-and-effect, I examined the price response of Allergan Common Stock to the fifteen earnings announcements and pre-announcements that occurred during the Class Period, an objective set of dates (see **Exhibit 7**).

62. There are many academic articles and financial treatises that explain theoretically and demonstrate empirically that the release of company earnings information often (but not necessarily always) causes a significant change in investors' beliefs regarding the value of a security.<sup>74</sup> Also, newly released earnings reports by a company are an objective set of news to identify and test. Considering April 30, 2014, the fourth earnings release listed in **Exhibit 7**, as an example, the Company announced positive first quarter results for the fiscal year 2014 with an

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more from the mean value. Generally, researchers use a decision rule based on one percent, five percent or ten percent significance levels.”)

<sup>74</sup> Beaver, W., “The Information Content of Annual Earnings Announcements,” *Empirical Research in Accounting: Selected Studies*, 1968, supplement to the *Journal of Accounting Research*, Vol. 6, 1968, pp. 67-92; May, R., “The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes,” *Empirical Research in Accounting: Selected Studies*, 1971, supplement to the *Journal of Accounting Research*, Vol. 9, 1971, pp. 119-163; Aharony, J., and Swary, I., “Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis,” *The Journal of Finance*, Vol. 35, No. 1, March 1980, pp. 1-12.

EPS \$0.26 above consensus.<sup>75</sup> In response, the market price of Allergan Common Stock increased 3.30%, compared to the predicted return of 0.47%, and had an abnormal return on April 30, 2014 of 2.83%. With a t-statistic of 2.08, this abnormal price movement is statistically significant, and I therefore have scientific evidence that Allergan Common Stock reacted rapidly to this new information.

63. Similar to this example, I analyzed the market reaction to Allergan's other earnings announcements I identified above. In total, of the fifteen preliminary and regular quarterly earnings announcements Allergan issued during the Class Period, seven resulted in statistically significant price movements above the 95% confidence level.<sup>76</sup> **Exhibit 7** presents a summary of the earnings releases during the Class Period.

64. Because it is more likely that material, new information about the Company would be released to the market on days with earnings announcements than on days without any such announcements, one can test the efficiency of a market by comparing the percentage of days with earnings announcements and a statistically significant stock price movement to the percentage of days with no or less news and a statistically significant stock movement—i.e., a movement that could not likely be accounted for by random chance alone. Therefore, I then compared these results against 56 days during the Class Period identified as having the least amount of news (“no

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<sup>75</sup> See "1Q Upside; Solid Visibility on LT Double Digit Growth; Staying Bullish," *Piper Jaffray*, April 30, 2014; "1Q/14 First Glance: EPS Upside Driven by Lower Opex and Tax - ALERT," *J.P. Morgan*, April 30, 2014.

<sup>76</sup> Additionally, one earnings announcement and one pre-announcement during the Analysis Period resulted in price movements that were statistically significant at the 90% confidence interval. It is not unusual to have earnings announcements that are not statistically significant. This would happen, for instance, in quarters where there was not much surprise and the firm roughly met expectations, if the firm offered little change in guidance, and/or if there was a mix of both positive and negative information that netted out.



news” or “days with no news”).<sup>77, 78</sup> Of these 56 days, there were 0 statistically significant price movements. Thus, during the Class Period there was a statistically significant price reaction at the 95% confidence level on 46.67% of the earnings announcements, but when compared to no news days, I observed statistically significant reactions 0.00% of the time.<sup>79</sup> For the no news days, the fact that I observed only 0 days with significant movements is consistent with what I would expect to observe by randomness alone.<sup>80</sup> This is powerful scientific evidence of a cause-and-effect relationship between new publicly released information concerning the Company and changes in the price of Allergan Common Stock.

65. Furthermore, on the 56 no news days, the average change in price of Allergan Common Stock was 0.72% after controlling for the broad market and the Peer Index, while the average change in Allergan Common Stock on earnings dates was 2.39%. In other words, the average magnitude of stock price movement on earnings announcement days was over 3 times higher than on dates with no news.<sup>81</sup> Again, this demonstrates that on days when important Company-specific information is released to the market, the stock price moves much more than on days where there is little Company-specific news. This provides further evidence of a cause-

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<sup>77</sup> Days with the no news were days that had 3 or fewer news articles via the Factiva database, and no analyst reports covering Allergan, earnings announcements, and SEC filings were issued. Analyst reports covering and SEC filings issued by Allergan, Inc., Forest Laboratories, and Pfizer while under merger consideration with Allergan are also included in the analyst reports and SEC filings counts. There were 14 days with at most three news articles that, based on a review of the articles, I could not dismiss the news as immaterial. These included: November 12, 2013, November 21, 2013, March 28, 2014, July 25, 2014, September 2, 2014, October 16, 2014, March 19, 2015, June 2, 2015, July 14, 2015, July 15, 2015, September 2, 2015, September 11, 2015, June 3, 2016, and August 17, 2016. Including these dates as no news dates would not alter the conclusions of the analysis.

<sup>78</sup> Due to the substantial news coverage and analyst following of this company there were very few days with no news, 1 news article, or 2 news articles. I chose 3 news articles as the threshold for identifying “no news” dates because that yielded a large enough sample size that the statistical power of the test would be sufficient.

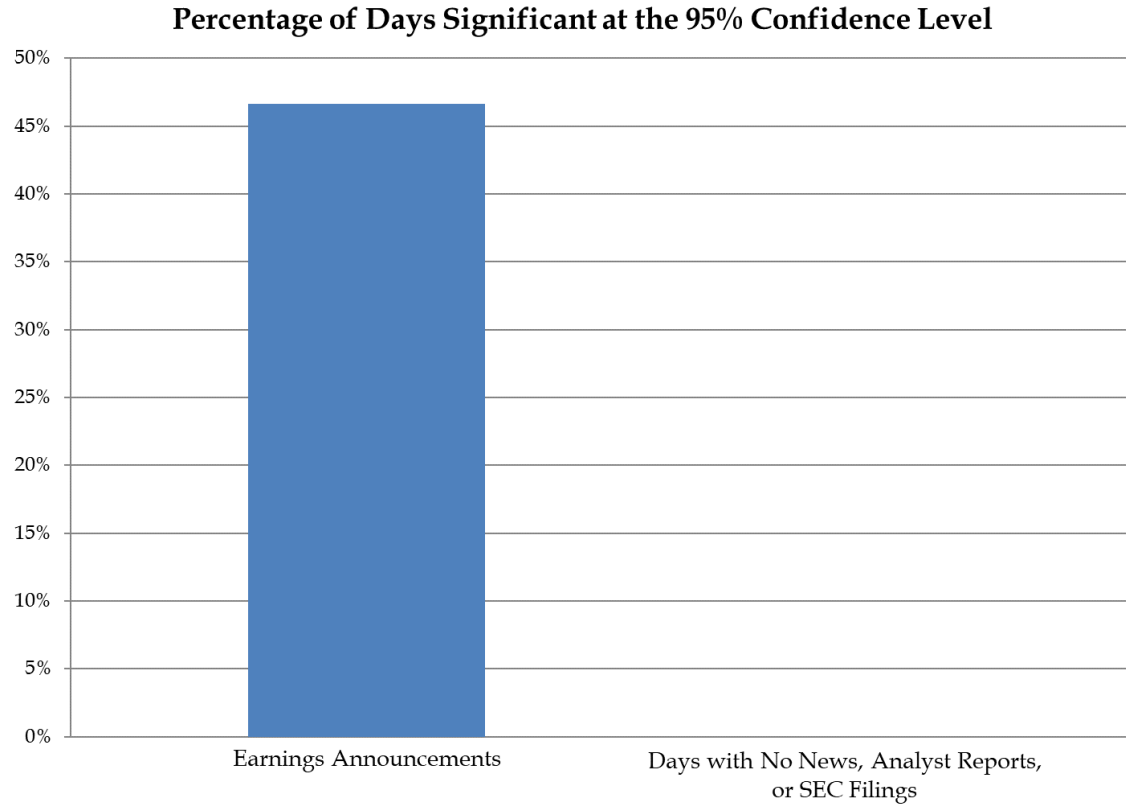
<sup>79</sup> This difference between 46.67% and 0.00% is itself statistically significant at the 99% confidence level.

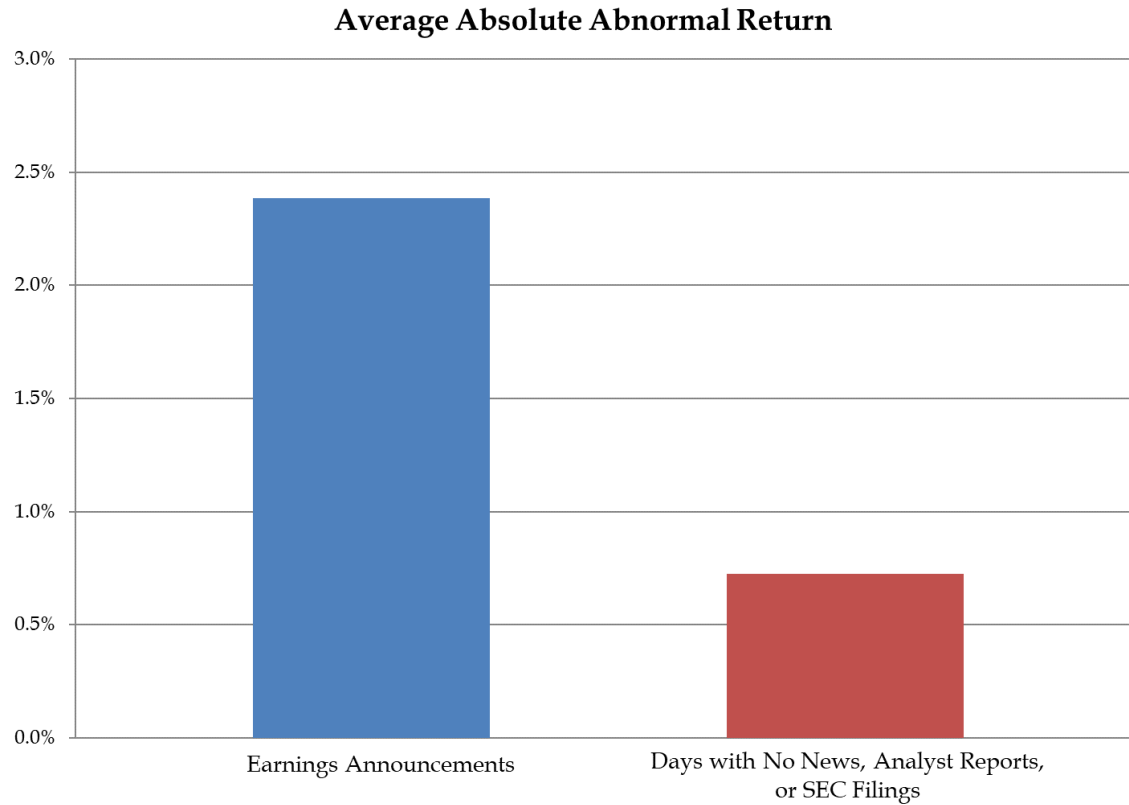
<sup>80</sup> There is no statistically significant difference between 0.00% and 5%. This is within the proportion of dates that would be significant by chance alone when using a 95% confidence interval.

<sup>81</sup> This difference between 2.39% and 0.72% is itself statistically significant at the 99% confidence level.

and-effect relationship between Company-specific news and changes in the price of Allergan Common Stock, and thus an efficient market.

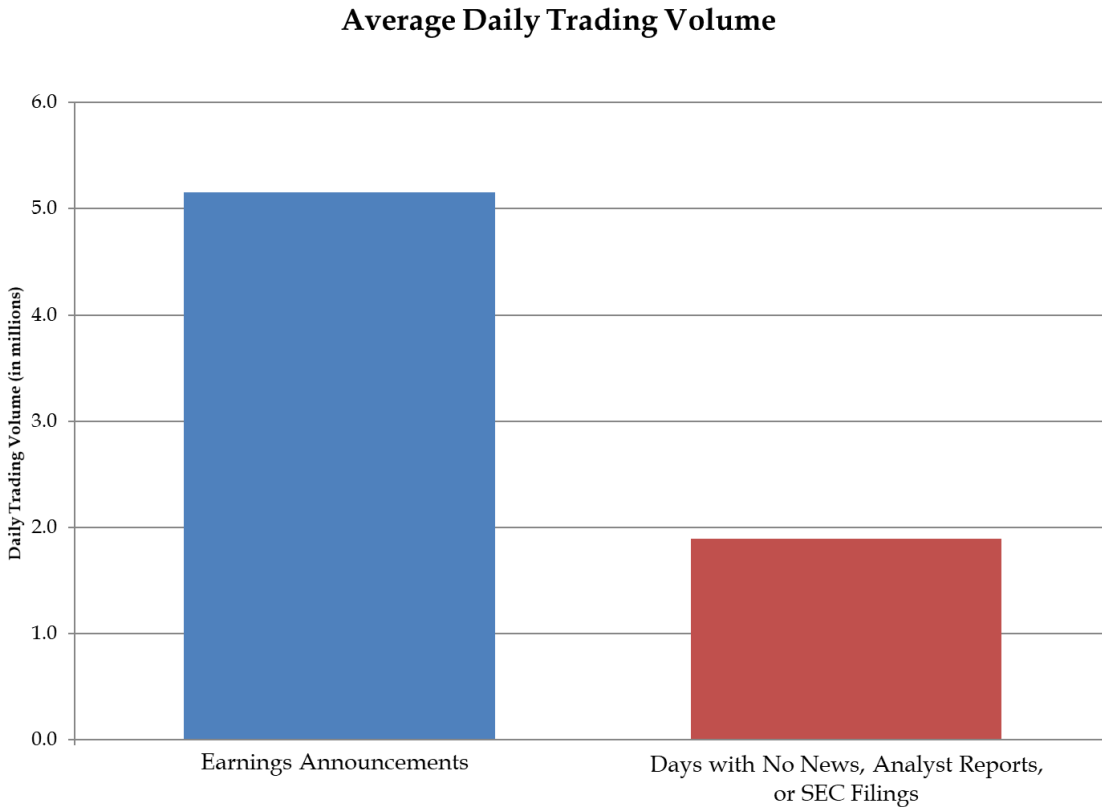
66. The bar charts below summarize this analysis while **Exhibit 9** gives more detail.





67. Finally, when important Company-specific news is released to the market (e.g., earnings announcements), the daily trading volume also tends to be much higher than on days where there is a low amount of news. For instance, the average daily trading volume of the 15 days with pre-announcements or earnings announcements was 5.2 million, as compared to the average daily trading volume of 1.9 million for days in the Class Period with no news.<sup>82</sup> The bar chart below summarizes this analysis.

<sup>82</sup> This difference between 5.2 million and 1.9 million is itself statistically significant at the 99% confidence level.



68. The bar charts above establish a strong cause-and-effect relationship between new, Company-specific news and rapid changes in the price of Allergan Common Stock. The earnings announcement days have a much greater percentage of significant price movements, higher daily trading volume on average, and statistically significantly larger price changes than the days with no news.

69. In conclusion, the event study analysis presented in this section demonstrate a clear cause-and-effect relationship between new material news and changes in the market price of Allergan Common Stock.

## **2. EVENT STUDY FOR PREFERRED STOCK**

70. I will begin by describing preferred stock in general, and then proceed to describe Allergan Preferred Stock which I specifically analyze in this case. In general, “preferred stock”

refers to securities which bear resemblance to both equity and debt. The exact terms for preferred stock can vary substantially for each issue.<sup>83</sup> Preferred stocks often receive a coupon payment like a bond, but may have a very long or perpetual maturity. They typically rank junior to debt (i.e., debt-holders would be repaid in a liquidation before preferred shareholders), but senior to common equity. Companies may also issue multiple classes (also called “series”) of preferred stock, which are ranked by seniority in relation to one another.<sup>84</sup> Preferred stock also often receive preferential treatment when it comes to dividends (e.g., preferred share coupon payments often must be made before any dividends can be paid to common shareholders).<sup>85</sup> In many cases, preferred stock issuances are callable, meaning the issuing company has the option to purchase back preferred shares at a predetermined price at their discretion.<sup>86</sup> In addition, preferred stock can often be converted to common stock. Sometimes this option is held by the investor and other times by the issuer. In addition, preferred stock represents ownership in the company, but owners of preferred stock do not usually have voting rights.<sup>87</sup>

71. Certain investors might find preferred stock more attractive relative to common stock for a variety of reasons. For example, it may offer regular cash flows that are not as sensitive to company performance as dividends on common stock, and institutions may find preferred stock particularly attractive because of favorable rules governing dividends. Also, it is

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<sup>83</sup> For example, see the discussion in Sharpe, W., Alexander, G., and Bailey, *Investments*, Prentice Hall, Fifth Edition, 1995, p. 420.

<sup>84</sup> Sharpe, W., Alexander, G., and Bailey, J., *Investments*, Prentice Hall, Fifth Edition, 1995, p. 420.

<sup>85</sup> Sharpe, W., Alexander, G., and Bailey, J., *Investments*, Prentice Hall, Fifth Edition, 1995, p. 420.

<sup>86</sup> Sharpe, W., Alexander, G., and Bailey, J., *Investments*, Prentice Hall, Fifth Edition, 1995, p. 420.

<sup>87</sup> Brealey, R., and Myers, S., *Principles of Corporate Finance*, McGraw-Hill, 1988, Third Edition, pp. 308-309.

typically a safer investment vehicle because in the event of a company's liquidation, preferred stockholders enjoy priority distribution of the company's assets over the common shareholders.<sup>88</sup>

72. On February 24, 2015, Allergan offered 5.06 million shares of 5.50% Mandatory Convertible Preferred Shares, Series A at \$1,000 per share.<sup>89, 90</sup> Holders of the Preferred Stock were entitled to receive quarterly dividends in cash, ordinary shares, or a combination of the two.<sup>91</sup> On March 1, 2018, the 5,060,000<sup>92</sup> preferred shares converted into 17,876,930 ordinary shares.<sup>93</sup> Holders may also have opted to convert the Preferred Stock at any time prior to March 1, 2018 into ordinary shares at a minimum conversion rate of 2.8435 ordinary shares per preferred share.<sup>94</sup>

73. Based upon the terms described above, i.e., the mandatory conversion features of the security, the market prices of these Preferred Stock from issuance and throughout the remainder of the Class Period would have been impacted by the same factors that influence Allergan Common Stock. Therefore, I adopt similar methodology for Allergan Preferred Stock, whereby I perform fixed regressions with each estimation window beginning and ending around the Corporate Action Events.<sup>95</sup> However, because the Preferred Stock were offered during the middle of the Analysis Period, there are only six estimation windows instead of nine.

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<sup>88</sup> Reilly, F., and Brown, K., *Investment Analysis and Portfolio Management*, The Dryden Press, Sixth Edition, 2000, p. 82; Brealey, R., and Myers, S., *Principles of Corporate Finance*, McGraw-Hill, 1988, Third Edition, pp. 308-309.

<sup>89</sup> Allergan plc SEC Form 10-K for the Fiscal Year-End December 31, 2015, p. F-79.

<sup>90</sup> Allergan's SEC filings state that the offering date was on February 24, 2015 but the first price available for this series occurs on February 25, 2015.

<sup>91</sup> Allergan plc SEC Form 10-K for the Fiscal Year-End December 31, 2015, p. F-79.

<sup>92</sup> Includes 460,000 shares issuable upon exercise of the underwriters' option to purchase additional shares. *See*, Actavis plc SEC Form 424(b)(2) Supplement filed February 25, 2015, p. 1.

<sup>93</sup> Allergan plc Form 10-Q for the Quarterly Period-End March 31, 2018, p. 35.

<sup>94</sup> *Id.*

<sup>95</sup> In keeping with the same methodology applied to the Common Stock, within each distinct estimation window, I use all of the observed returns for the Company, the Market Index, and the Peer Index within that window to

74. The first estimation window begins with the first day a return is available for Allergan Preferred Stock, February 26, 2015, and ends March 16, 2015, the day before Actavis completed the acquisition of Allergan, Inc.<sup>96</sup> Estimation windows 2 through 6 are equivalent to windows 5 through 9 of the Common Stock.<sup>97</sup>

75. The models indicate that there is a positive correlation between Allergan Preferred Stock and the control variables. In other words, the movement of the Market Index and Peer Index helps explain the price movements of Allergan Preferred Stock. For instance, choosing a day in the Analysis Period purely as an example, December 15, 2015, and looking at the regression results based on the fixed regression of that estimation window for that day, the estimated coefficient for the S&P 500 is 0.50, which means that a 1% rise in the S&P 500 predicts a 0.50% increase in returns for Allergan Preferred Stock. The estimated coefficient for the Peer Index is 0.27, meaning that the expected return for Allergan Preferred Stock is about a 0.27% increase for every 1% increase in the Peer Index over and above the return of the S&P 500. **Exhibit 5-P** plots the estimated coefficients for the regression models for each estimation window during the Analysis Period, and it demonstrates there was a consistently positive

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estimate my regression model. The results of that regression model are in turn applied to all days within the window, to assess the abnormal movement of Company Preferred Stock on each day. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates are not included in creating the model. The outlier dates include 7/27/2015, Teva announces agreement to purchase Allergan's generics business; and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

<sup>96</sup> "Actavis Completes Allergan Acquisition," *PR Newswire*, March 17, 2015, 8:55 AM EST.

<sup>97</sup> Estimation Window 2: the Allergan Acquisition (3/17/2015) until Allergan announces the sale of its generic business to Teva Pharmaceuticals (7/27/2015). Estimation window 3: Allergan's sale agreement of its generics business to Teva (7/27/2015) until the confirmation of combination talks between Pfizer and Allergan (10/29/2015). Estimation Window 4: the confirmation of combination talks between Pfizer and Allergan (10/29/2015) until Allergan announces the termination of combination talks with Pfizer (4/6/2016). Estimation window 5: Allergan's announcement of the termination of combination talks with Pfizer until the divestiture of Allergan's generics business to Teva (8/2/2016). Estimation Window 6: the divestiture of the Allergan's generic business to Teva through the end of the Analysis Period (11/2/2016).

relationship between the general market, the Peer Index, and the price of Allergan Preferred Stock.

76. As explained above, the standard deviation of the errors provides a metric for how much “randomness” remains in the price movement of Allergan Preferred Stock after controlling for the Market Index and Peer Index. For instance, on the example date, December 15, 2015, the model predicted that absent any new firm-specific information, the price of Allergan Preferred Stock would increase by 1.05% because the S&P 500 was up 1.06% and the Peer Index was up 2.01%.<sup>98</sup> Because of the inherent randomness observed in stock price returns, I do not expect the model to predict returns exactly. In this example, I observe an actual return of 1.63%. Thus, the “abnormal return” for this day is 0.58% (the actual return of 1.63% minus the predicted return of 1.05%). I then rely on the standard deviation of the errors from the regression model to tell if this abnormal return of 0.58% is sufficiently large that I reject random movement as the explanation.

77. The “t-statistic,” as explained previously, is an important statistic that tests for randomness. For the example date, an abnormal return of 0.58% represents 0.42 standard deviations or a t-statistic of 0.42 (abnormal return of 0.58% divided by the standard deviation of the errors of 0.0139). Using the standard assumption that, in the absence of new Company-specific news, abnormal returns will be normally distributed around zero, probability theory implies that based on randomness alone, using a 95% confidence level and large sample size, the abnormal return should have a t-statistic greater than 1.96 (or less than -1.96) only 5% of the time.<sup>99</sup> Stating this point another way, there is a 95% confidence that the actual return will fall

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<sup>98</sup> The expected return of 1.05% is found as follows:  $0.50 * 1.06\%$  (Coefficient on Market Index *times* Market Index return) +  $.27 * 2.01\%$  (Coefficient on Peer Index Return *times* Peer Index Return) +  $-0.02\%$  (constant term from the regression results).

<sup>99</sup> Tabak, D., and Dunbar, F., “Materiality and Magnitude: Event Studies in the Courtroom,” Ch. 19, *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, 2001. The financial economics literature often identifies the 90% threshold as a relevant boundary for significance as well.



within 1.96 standard deviations of the predicted return unless there is some non-random explanation. Since our example has a t-statistic of 0.42, the abnormal return is not statistically significant at the 95% confidence level, and I cannot reject randomness as the cause of the abnormal price movement with greater than 95% confidence. By contrast, if on a particular day one observes an abnormal return that has a t-statistic of a magnitude greater than 1.96 (statistically significant at the 95% confidence level) and one observes new firm-specific information, one would reject randomness as the explanation with 95% confidence and infer that the new information is the cause of the stock price movement.

78. **Exhibit 6-P** shows that the standard deviation of the errors for Allergan Preferred Stock varied over the Analysis Period. The standard deviation of the errors during the different estimation windows are not substantially different.

79. To analyze cause-and-effect, I examined the price response of Allergan Preferred Stock to the seven earnings announcements that occurred during the Analysis Period, an objective set of dates (see **Exhibit 7-P**).

80. As discussed above, company earnings information often (but not necessarily always) causes a significant change in investors' beliefs regarding the value of a security.<sup>100</sup> Also, newly released earnings reports by a company are an objective set of news to identify and test. Considering May 10, 2016, the fifth earnings release listed in **Exhibit 7-P**, as an example, the Company announced positive first quarter results for the fiscal year 2016 and a plan to

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<sup>100</sup> Beaver, W., "The Information Content of Annual Earnings Announcements," *Empirical Research in Accounting: Selected Studies*, 1968, supplement to the *Journal of Accounting Research*, Vol. 6, 1968, pp. 67-92; May, R., "The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes," *Empirical Research in Accounting: Selected Studies*, 1971, supplement to the *Journal of Accounting Research*, Vol. 9, 1971, pp. 119-163; Aharony, J., and Swary, I., "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *The Journal of Finance*, Vol. 35, No. 1, March 1980, pp. 1-12.

repurchase \$4-5bn of shares.<sup>101</sup> In response, the market price of Allergan Preferred Stock increased 3.33%, compared to the predicted return of 0.85%, and had an abnormal return on May 10, 2016 of 2.48%. With a t-statistic of 2.39, this abnormal price movement is statistically significant, and I therefore have scientific evidence that Allergan Preferred Stock reacted rapidly to this new information.

81. Similar to this example, I analyzed the market reaction to Allergan's other earnings announcements I identified above. In total, of the seven regular quarterly earnings Allergan issued during the Analysis Period, three resulted in statistically significant price movements above the 95% confidence level.<sup>102</sup> **Exhibit 7-P** presents a summary of the earnings releases during the Analysis Period.

82. I then compared these results against the 15 days during the Analysis Period identified as having the least amount of news ("no news days" or "days with no news").<sup>103, 104</sup> Of these 15 days, 1 exhibited a statistically significant price movement. Thus, during the Analysis Period there was a statistically significant price reaction at the 95% confidence level on 42.86% of the earnings announcements, compared to the 15 no news days, I observed statistically

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<sup>101</sup> See "Good Q, Raising EPS on buyback program," *Deutsche Bank*, May 10, 2016; "AGN: Good Combo: Q1 Results, Pipeline Progress And \$10B Buyback," *Wells Fargo*, May 10, 2016.

<sup>102</sup> Additionally, one earnings announcement during the Analysis Period resulted in a price movement that was statistically significant at the 90% confidence interval. It is not unusual to have occasional earnings announcements that are not statistically significant. This would happen, for instance, in quarters where there was not much surprise and the firm roughly met expectations, if the firm offered little change in guidance, and/or if there was a mix of both positive and negative information that netted out.

<sup>103</sup> Days with no news were days that had 3 or fewer news articles via the Factiva database, and no analyst reports, earnings announcements, and SEC filings were issued. Analyst reports covering and SEC filings issued by Allergan, Inc. and Pfizer while under merger consideration with Allergan are also included in the analyst reports and SEC filings counts. There were 7 days with at most three news articles which, based on a review of the articles, I could not dismiss the news as immaterial. These included: June 2, 2015, July 14, 2015, July 15, 2015, September 2, 2015, September 11, 2015, June 3, 2016, and August 17, 2016. Including these dates as no news days would not alter the conclusions of the analysis.

<sup>104</sup> Due to the substantial news coverage and analyst following of this company there were very few days with no news, 1 news article, or 2 news articles. I chose 3 news articles as the threshold for identifying "no news" dates because that yielded a large enough sample size that the statistical power of the test would be sufficient.

significant reactions 6.67% of the time.<sup>105</sup> For days with no news, the fact that I observed only 1 day with a significant movement is consistent with what I would expect to observe by randomness alone.<sup>106</sup> This is powerful scientific evidence of a cause-and-effect relationship between new publicly released information concerning the Company and changes in the price of Allergan Preferred Stock.

83. Furthermore, on the 15 no news days, the average change in price of Allergan Preferred Stock was 0.80% after controlling for the broad market and the Peer Index, while the average change in Allergan Preferred Stock on earnings dates was 2.05%. In other words, the average magnitude of stock price movement on earnings announcement days was over 2.5 times higher than on dates with no news.<sup>107</sup> Again, this demonstrates that on days when important Company-specific information is released to the market, the stock price moves much more than on days where there is little Company-specific news. This provides further evidence of a cause-and-effect relationship between Company-specific news and changes in the price of Allergan Preferred Stock, and thus an efficient market.

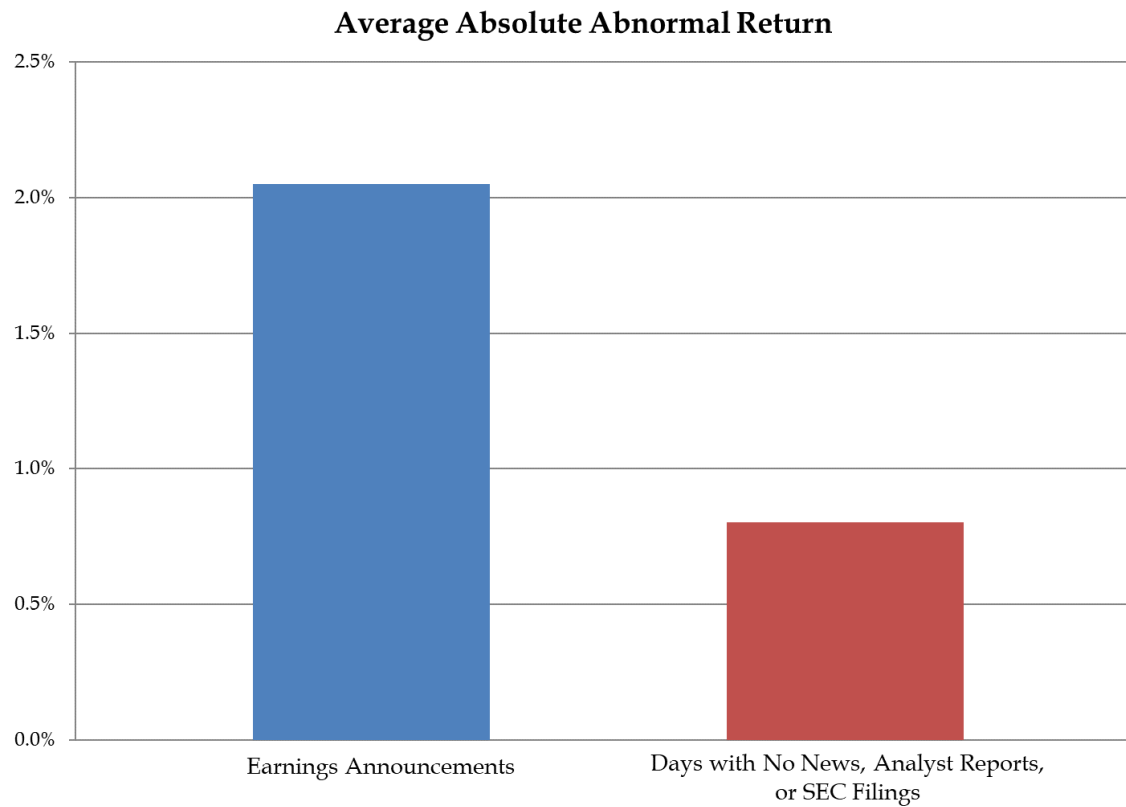
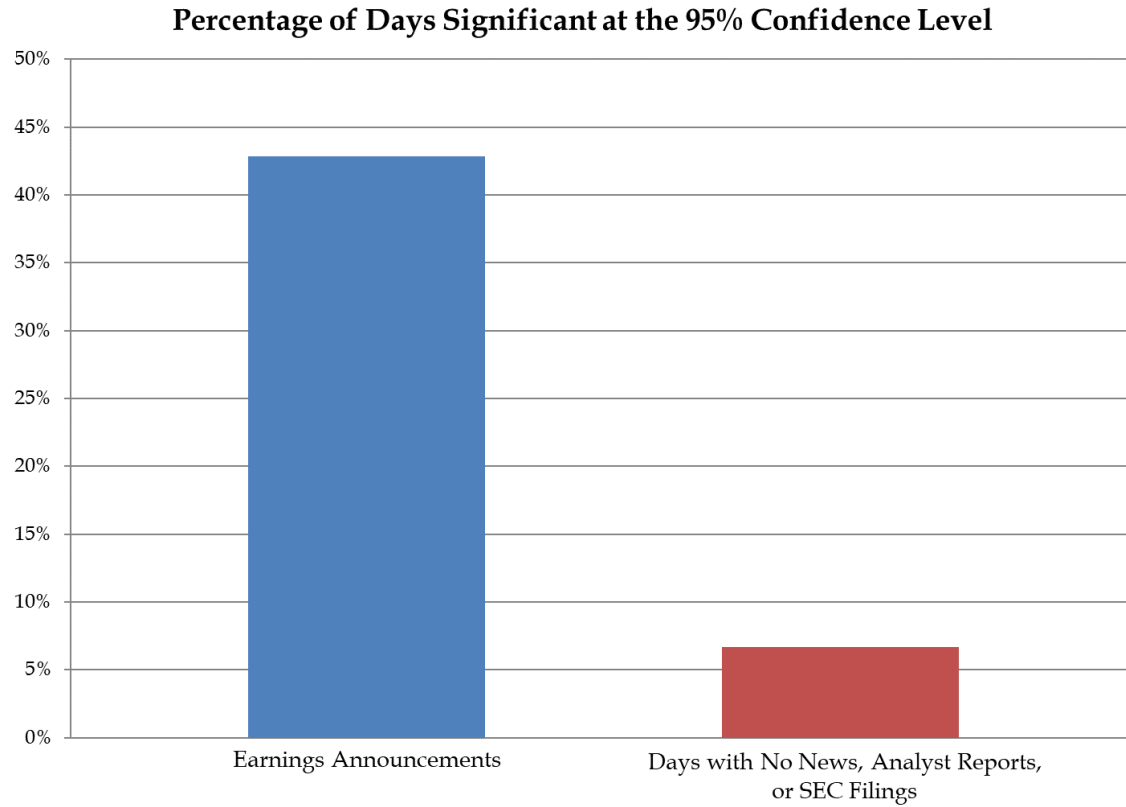
84. The bar charts below summarize this analysis while **Exhibit 9-P** gives more detail.

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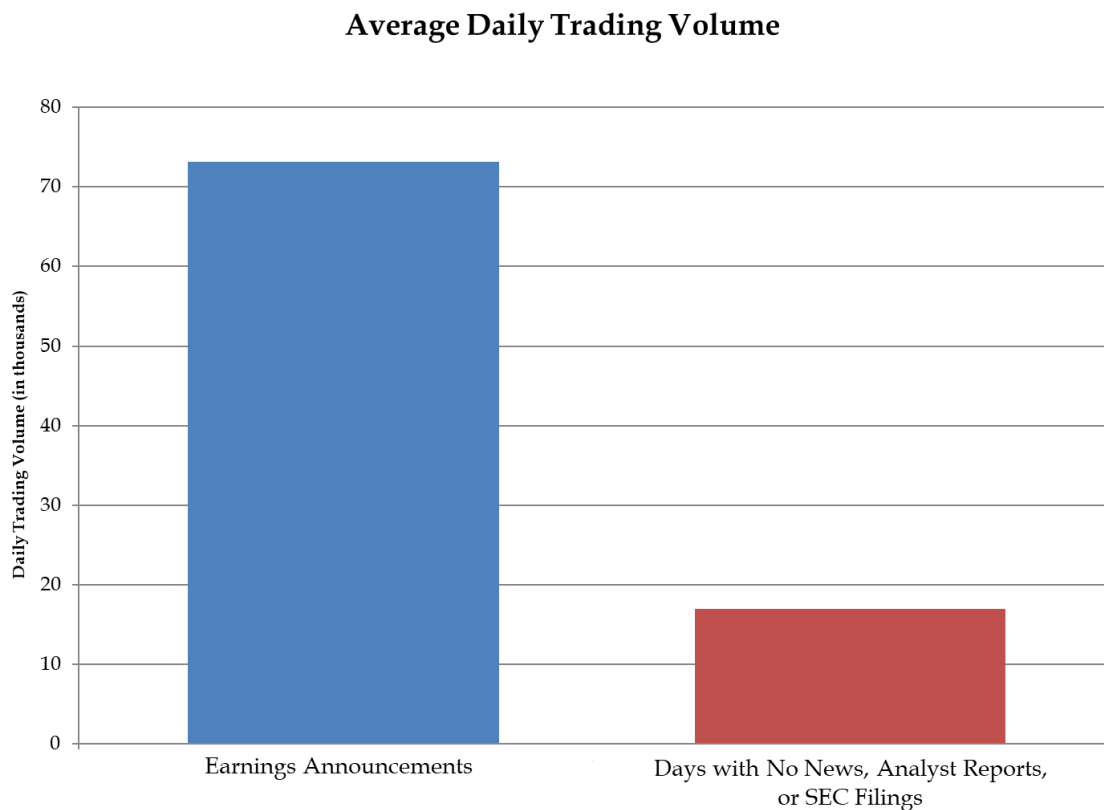
<sup>105</sup> This difference between 42.86% and 6.67% is itself statistically significant at the 90% confidence level.

<sup>106</sup> There is no statistically significant difference between 6.67% and 5%. This is within the proportion of dates that would be significant by chance alone when using a 99% confidence interval.

<sup>107</sup> This difference between 2.05% and 0.80% is itself statistically significant at the 99% confidence level.



85. Finally, as mentioned in the Common Stock Section, the daily trading volume also tends to be much higher on days with Company-specific news than on days where there is a low amount of news. For instance, the average daily trading volume of the seven days with earnings announcements was 73.1 thousand. Compare this to the average daily trading volume of 17.0 thousand for days in the Analysis Period with no news.<sup>108</sup> The bar chart below summarizes this analysis.



86. The bar charts above establish a strong cause-and-effect relationship between new, Company-specific news and rapid changes in the price of Allergan Preferred Stock. The earnings announcement days have a much greater percentage of significant price movements, higher daily

<sup>108</sup> This difference between 73.1 thousand and 17.0 thousand is itself statistically significant at the 99% confidence level.

trading volume on average, and statistically significantly larger price changes than the days with no news.

87. In conclusion, the event study analysis presented in this section demonstrates a clear cause-and-effect relationship between new material company specific news and changes in the market price of Allergan Preferred Stock.

**G. KROGMAN FACTOR 1: MARKET CAPITALIZATION**

88. In *Krogman v. Sterritt*, the court noted that economic theory includes other possible relevant factors for determining whether a stock trades in an efficient market, in addition to the *Cammer* factors.<sup>109</sup> The *Krogman* Court held, “[m]arket capitalization, calculated as the number of shares multiplied by the prevailing share price, may be an indicator of market efficiency because there is a greater incentive for stock purchasers to invest in more highly capitalized corporations.”<sup>110</sup> Furthermore, Thomas and Cotter find that firms with a larger market capitalization tend to have “larger institutional ownership and tend to be listed on the NYSE with a greater analyst following.”<sup>111</sup> Therefore, market capitalization is another quantifiable measure that is likely correlated with efficiency.

89. Allergan Common Stock had a market capitalization in the top 5% of all companies trading on the NYSE and NASDAQ, thus suggesting this factor is supportive of efficiency. There were between 174.0 million and 396.0 million shares of Allergan Common Stock outstanding during the Class Period.<sup>112</sup>

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<sup>109</sup> *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001) (“*Krogman*”). The factors identified by the *Krogman* Court are 1) market capitalization, 2) size of float of common stock, and 3) bid-ask spread.

<sup>110</sup> *Krogman*, 202 F.R.D. at 478.

<sup>111</sup> Thomas, R., and Cotter, J., *Measuring Securities Market Efficiency in the Regulatory Setting*, 63 LAW & CONTEMP. PROBS. 105 (2000), 117.

<sup>112</sup> Allergan plc SEC filings submitted throughout the Class Period.

90. Based on the market price, the market capitalization for Allergan Common Stock averaged \$81.9 billion during the Class Period. **Exhibit 10** shows Allergan Common Stock's market capitalization over the Class Period. **Exhibit 11** shows that during the Class Period, Allergan Common Stock market capitalization was between the 96<sup>th</sup> and 99<sup>th</sup> percentile of the combined NYSE and NASDAQ markets for the applicable quarters during the Class Period.<sup>113</sup> In other words, on average, over the Class Period, Allergan Common Stock had a higher market capitalization than 96% of the firms on the combined NYSE and NASDAQ exchanges.

91. There were 5.06 million shares of Preferred Stock outstanding during the Analysis Period.<sup>114</sup> Based on the market price, the market capitalization for Allergan Preferred Stock averaged \$4.8 billion during the Analysis Period. **Exhibit 10-P** shows Allergan Preferred Stock's market capitalization over the Analysis Period. **Exhibit 11-P** shows that during the Analysis Period, Allergan Preferred Stock market capitalization was between the 78<sup>th</sup> and 83<sup>rd</sup> percentile of the combined NYSE and NASDAQ markets for the applicable quarters during the Class Period.<sup>115</sup> In other words, on average, over the Class Period, Allergan Preferred Stock had a higher market capitalization than 78% of the firms on the combined NYSE and NASDAQ exchanges.

92. Given that the market capitalization Allergan Common Stock and Allergan Preferred Stock as a whole were in the top 5% and top 22%, respectively, of the largest publicly traded companies, this factor is supportive of market efficiency for the Allergan Securities.

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<sup>113</sup> Bloomberg.

<sup>114</sup> Allergan plc SEC filings submitted throughout the Analysis Period.

<sup>115</sup> Bloomberg.

## H. *KROGMAN FACTOR 2: THE BID-ASK SPREAD*

93. The second *Krogman* factor considers the bid-ask spread for a security, reasoning that: “[a] large bid-ask spread is indicative of an inefficient market, because it suggests that the stock is too expensive to trade.”<sup>116</sup> The bid-ask spread is an important indicator of the degree to which a market is developed. The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price. In addition, the wider the bid-ask spread, the more costly it is to arbitrage away small inefficiencies. Thus, the narrower the bid-ask spread, the greater indication of an efficient market.

94. I analyzed bid-ask spreads for Allergan Common Stock during the Class Period. **Exhibit 12** shows that during this period, the time-weighted average percentage bid-ask spread for Allergan Common Stock in each month was between 0.013% and 0.078%. This is well below the average and median bid-ask spread of a random sample of 100 other common stocks trading on the NYSE and NASDAQ in October 2015 (the full month during the Class Period when Allergan Common Stock had the largest percentage bid-ask spread).<sup>117,118</sup> **Exhibit 12** demonstrates that Allergan Common Stock had a monthly average bid-ask spread of 0.078% in October 2015, while a randomly selected group of 100 other common stocks on the NYSE and

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<sup>116</sup> *Krogman*, 202 F.R.D. at 478.

<sup>117</sup> Quote data for Allergan and other publicly traded stocks were obtained from the TICK database. *See* <https://tickapi.tickdata.com/>.

<sup>118</sup> I constructed a random sample because I am not aware of any exchange-wide reporting of average or median bid-ask spreads. Determining the average bid-ask spread for the entire market would be a very costly and data intensive process, therefore I adopted a random sampling methodology. I determined the constituents of the NYSE and NASDAQ for October 2015 and then randomly generated a list of 100 common stock securities. I then calculated the time-weighted average monthly bid-ask spread for October 2015.



NASDAQ had an average bid-ask spread of 1.77%.<sup>119</sup> Accordingly, Allergan Common Stock bid-ask spread was low during the Class Period, and this factor further supports market efficiency for Allergan Common Stock.

95. As with the Common Stock, I analyzed bid-ask spreads for Allergan Preferred Stock and compared them to a random sample of 100 other publicly traded stocks in October 2015.<sup>120</sup> As **Exhibit 12-P** shows, during this period, the time-weighted average percentage bid-ask spread for Allergan Preferred Stock in each month was between 0.057% and 0.20%. Allergan Preferred Stock had a bid-ask spread below 1.77%, the average bid ask spread of those 100 common stocks trading on the NYSE and NASDAQ. Therefore, Allergan Preferred Stock was low during the Class Period, and therefore this factor further supports efficiency for Allergan Securities.

#### **I. KROGMAN FACTOR 3: PUBLIC FLOAT**

96. The final factor that the *Krogman* Court identified as being indicative of market efficiency is the public float (i.e., the amount of shares not held by insiders) is considered to be indicative of market efficiency. As shown in **Exhibit 13**, during the Class Period, insiders held, on average, 0.29% of all outstanding shares of Allergan Common Stock, meaning that

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<sup>119</sup> The time-weighted average bid-ask spread was calculated by taking the average of the spread during trading hours on the primary exchange of each security, weighted by the amount of time each quote prevails in the market. That is, I take the weighted average quote, with the weight being the number of seconds between that quote and the next quote that occurs. Spread is calculated as the difference between the bid price and ask price divided by the midpoint of the bid-ask spread. I calculated the National Best Bid and Offer using the data filtering procedures described in Huang, R., and Stall, H., *Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE*, 41 J. FIN. ECON. 313 (1996).

<sup>120</sup> Quote data for Allergan Series A Preferred Stock and other publicly traded stocks was obtained from Tick Data. See [www.tickdata.com](http://www.tickdata.com). Earliest Allergan Preferred Stock Tick Data is available March 5, 2015.

approximately 99% of shares were held by non-insiders. This large percentage of shares held by non-insiders supports a finding of market efficiency.<sup>121</sup>

#### **J. *INSTITUTIONAL OWNERSHIP***

97. Institutional investors are considered to be sophisticated and well-informed with access to most publicly available information for the stocks that they own. These investors include mutual funds, pension funds, investment banks, and other types of large financial institutions that have substantial resources to analyze the securities they purchase for their portfolios. As **Exhibit 13** shows, 2,408 institutions reported owning Allergan Common Stock during the Class Period, holding, on average, over 89% of the public float. This substantial level of institutional ownership of Allergan Common Stock during the Class Period coupled with the high trading volume further supports a conclusion of market efficiency.<sup>122</sup>

#### **K. *AUTOCORRELATION***

98. If previous price movements of a security have the ability to predict future price movements, then it is said to be “autocorrelated.” Autocorrelation is relevant to efficiency because if the autocorrelation is persistent and sufficiently large such that a trader could profit from taking advantage of the autocorrelation, it means that past price movements are not fully reflected in the current price, which would suggest market inefficiency.

99. Autocorrelation may occur from time to time for random reasons or due to the pattern of firm-specific news. Efficiency would only be violated, however, if the autocorrelation

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<sup>121</sup> Insider holdings for Preferred Stock was not provided in Allergan Def 14-A Proxy Statements for the fiscal years in the Class Period.

<sup>122</sup> Institutions also held the Preferred Stock although the data available was limited. However, five institutions that were in the top ten institutional holders for Allergan Common Stock during the Class Period held between 15% and 20% of the Preferred Shares Outstanding. This supports that Allergan Preferred Stock traded in an efficient market.

were large enough and persistent enough that a trader could consistently earn riskless profits over time.<sup>123</sup>

100. A well-accepted methodology to test for the existence of autocorrelation is to run a regression analysis that tests whether, on average, the abnormal return from the previous day has a statistically significant effect on the abnormal return today.<sup>124</sup> If the previous day's abnormal return has no statistically significant predictive power, then there is no evidence of autocorrelation.

101. **Exhibit 14** and **Exhibit 14-P** show the coefficients and the associated t-statistics for the regressions of Allergan Securities abnormal return against the abnormal return from the previous day for each quarter during the Class Period. **Exhibit 14** shows that there is no significant autocorrelation in the returns of Allergan Common Stock over the Class Period.

102. **Exhibit 14-P** does show significant negative autocorrelation present for the Preferred Stock during the Analysis Period, in other words, a tendency for the price to reverse from the prior day's return. However, upon further investigation, the significant results were being driven by two narrow periods of successive days of alternating positive and negative news. Thus, the observed negative autocorrelation is easily explained by a discrete series of firm specific events and not in any way reflective of inefficiency. Indeed, once the specific days in **Exhibit 15** are excluded, the results show no significant autocorrelation (see **Exhibit 16**).<sup>125</sup>

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<sup>123</sup> Avramov, D., et al., Liquidity and Autocorrelations in Individual Stock Returns, 61 J. FIN. 2365, 2367-68 (2006); Jensen, M., Some Anomalous Evidence Regarding Market Efficiency, 6 J. FIN. ECON. 95 (1978).

<sup>124</sup> Greene, W., *Econometric Analysis*, Prentice Hall, Sixth Edition, 2008, Chapter 19, p. 644.

<sup>125</sup> Once these days are excluded from the autocorrelation analysis for the Common Stock, the observed significant results for the seventh estimation window are eliminated.

## **L.      *OPTIONS***

103. In addition to the factors analyzed above, there was also option trading in Allergan Common Stock during the Class Period.<sup>126</sup> Academic articles have demonstrated that options written on existing assets can improve efficiency by permitting an expansion of the contingencies that are covered by the market.<sup>127</sup> Empirical analysis has shown that option listings are associated with a decrease in bid-ask spread and increase in quoted depth, trading volume, trading frequency, and transaction size – an overall improvement of the market quality of the underlying stocks.<sup>128</sup> The existence of active option trading in Allergan Common Stock provides evidence supporting efficiency.

## **VIII.   DAMAGES**

104. Although I have not been asked to calculate class-wide damages in this action, which I understand will be subject to further discovery, it is clear that damages in this matter can be calculated using methodologies common to Class Members who purchased Allergan Securities and have claims under Section 10(b) and/or Section 14(a) of the Exchange Act. In this matter, Section 10(b) damages can be calculated for all those who purchased Allergan Common Stock and Allergan Preferred Stock during the Class Period and were damaged thereby.<sup>129</sup> Indeed, the standard and well-settled formula for assessing damages for each class member under Section 10(b) is the “out-of-pocket” method that measures damages as the artificial inflation per share at the time of purchase less the artificial inflation at the time of sale (or, if the share is not

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<sup>126</sup> For instance, according to data downloaded from iVolatility, there were 3,599,774 Allergan Common Stock put contracts and 5,124,037 Allergan Common Stock call contracts that traded during the Class Period.

<sup>127</sup> Ross, S., *Options and Efficiency*, 90 Q. J. ECON. 75 (1976).

<sup>128</sup> Kumar, R., et al., *The Impact of Options Trading on the Market Quality of the Underlying Security: An Empirical Analysis*, 53 J. FIN. 717 (1998).

<sup>129</sup> Complaint ¶¶ 32.

sold before full revelation of the fraud, the artificial inflation at the time of purchase, subject to the Private Securities Litigation Reform Act of 1995's "90-day lookback" provision, a formulaic limit on damages that also can be applied class-wide).<sup>130</sup>

105. As I mentioned above, although I have not been asked to calculate class-wide damages, it is also clear that Section 14(a) damages can be calculated for all those who received shares from the Forest Acquisition and Allergan Acquisition. The damages suffered by holders of record under Section 14(a) as a result of the misrepresentations and omissions in the proxy materials are most reliably measured by quantifying the diminution in value of Allergan Common Stock that occurred upon revelation of the corrective information. For each share of Allergan Common Stock received from the Acquisitions and subsequently held through at least one Corrective Disclosure Event, damages per share for any given investor under Section 14(a) are determined by the change in Allergan stock price attributed to the corrective information related to the misrepresentations and omissions made related to the generic drug price fixing and antitrust conspiracy (subject to any statutory cap).

106. The methodology and evidence for establishing the artificial inflation per share in the market price on each day during the Class Period is also common to the Section 10(b) and Section 14(a) Classes and can be measured class-wide. In particular, as is standard procedure in Section 10(b) and Section 14(a) cases, the most common methodology to quantify daily artificial share price inflation is to perform an event study that measures price reactions to disclosures that

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<sup>130</sup> Specifically, the Private Securities Litigation Reform Act of 1995 states: "...in any private action arising under this title in which the plaintiff seeks to establish damages by reference to the market price of a security, the award of damages to the plaintiff shall not exceed the difference between the purchase or sale price paid or received, as appropriate, by the plaintiff for the subject security and the mean trading price of that security during the 90-day period beginning on the date on which the information correcting the misstatement or omission that is the basis for the action is disseminated to the market." *See*, Private Securities Litigation Reform Act of 1995, dated December 22, 1995, 737, 748-49.

revealed the relevant truth concealed by the alleged material omissions and/or misrepresentations. This analysis, and the evidence supporting it, would be common to the Section 10(b) and Section 14(a) Classes. Damages for any individual class member could then be calculated formulaically based upon information collected in the claims process (*i.e.*, the investor's purchase and sale history for the security, which is routinely available from brokerage statements and/or other documents that provide evidence of securities transactions). Accordingly, although I have not been asked to calculate class-wide damages, based on my expertise and experience in dozens of similar matters and understanding the nature of the claims in this case, I conclude that damages in this action are subject to a well-settled, common methodology that can be applied to members of the Section 10(b) and Section 14(a) Classes.

## **IX. CONCLUSION**

107. In sum, every factor analyzed supports my opinion that Allergan Securities traded in efficient markets during the Class Period. Furthermore, class-wide damages in this matter can be calculated using common methodologies for the Section 10(b) Class and the Section 14(a) Classes.

108. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on March 20, 2020.

  
Chad Coffman

## Exhibit 1

### Summary of Efficiency Factors for Allergan Common and Preferred Stock

Factor	Summary of Factor	Allergan Common Stock	Allergan Preferred Stock
Average Weekly Trading Volume Cammer I	"Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for a security is an efficient one; 1% would justify a substantial presumption."	<ul style="list-style-type: none"> <li>The average weekly trading volume of 5.05%, as a percentage of shares outstanding, exceeds the standard of 2% that courts have suggested would justify a strong presumption of an efficient market (Note: 15.3 million shares traded weekly on average during the Class Period).</li> </ul>	<ul style="list-style-type: none"> <li>The average weekly trading volume of 4.82% (4.16% excluding the first week), as a percentage of shares outstanding, exceeds the standard of 2% that courts have suggested would justify a strong presumption of an efficient market (Note: 243.2 thousand shares traded weekly on average during the Analysis Period).</li> </ul>
Analyst Coverage Cammer II	"...it would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors."	<ul style="list-style-type: none"> <li>During the Class Period at least 41 securities analysts issued 1,004 analyst reports which implies that important information relevant to trading Allergan Common and Preferred Stock was widely communicated to the market.</li> </ul>	
Market Makers Cammer III	"For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption."	<ul style="list-style-type: none"> <li>Because Allergan's shares were exchange-traded on the NYSE during the Class Period, not over the counter, this factor is satisfied. According to Bloomberg, from January 1, 2015 through the end of the Class Period, there were at least 173 market makers for Allergan Common Stock.</li> </ul>	
SEC Form S-3 Eligibility Cammer IV	"It would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency."	<ul style="list-style-type: none"> <li>Allergan filed a Form S-3 during the Class Period (August 1, 2014) and Form S-3ASR's during and after the Class Period (on February 19, 2015 and February 16, 2018). I have found no evidence that Allergan was not S-3 eligible throughout the Class Period, thus satisfying this factor.</li> </ul>	
Price Reaction to New Information Cammer V	"...one of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price."	<ul style="list-style-type: none"> <li>The event study demonstrates a clear cause and effect relationship. A statistical test shows a significant contemporaneous relationship between new firm-specific news and significant changes in the market price for Allergan Common and Preferred Stock.</li> </ul>	

## Exhibit 1

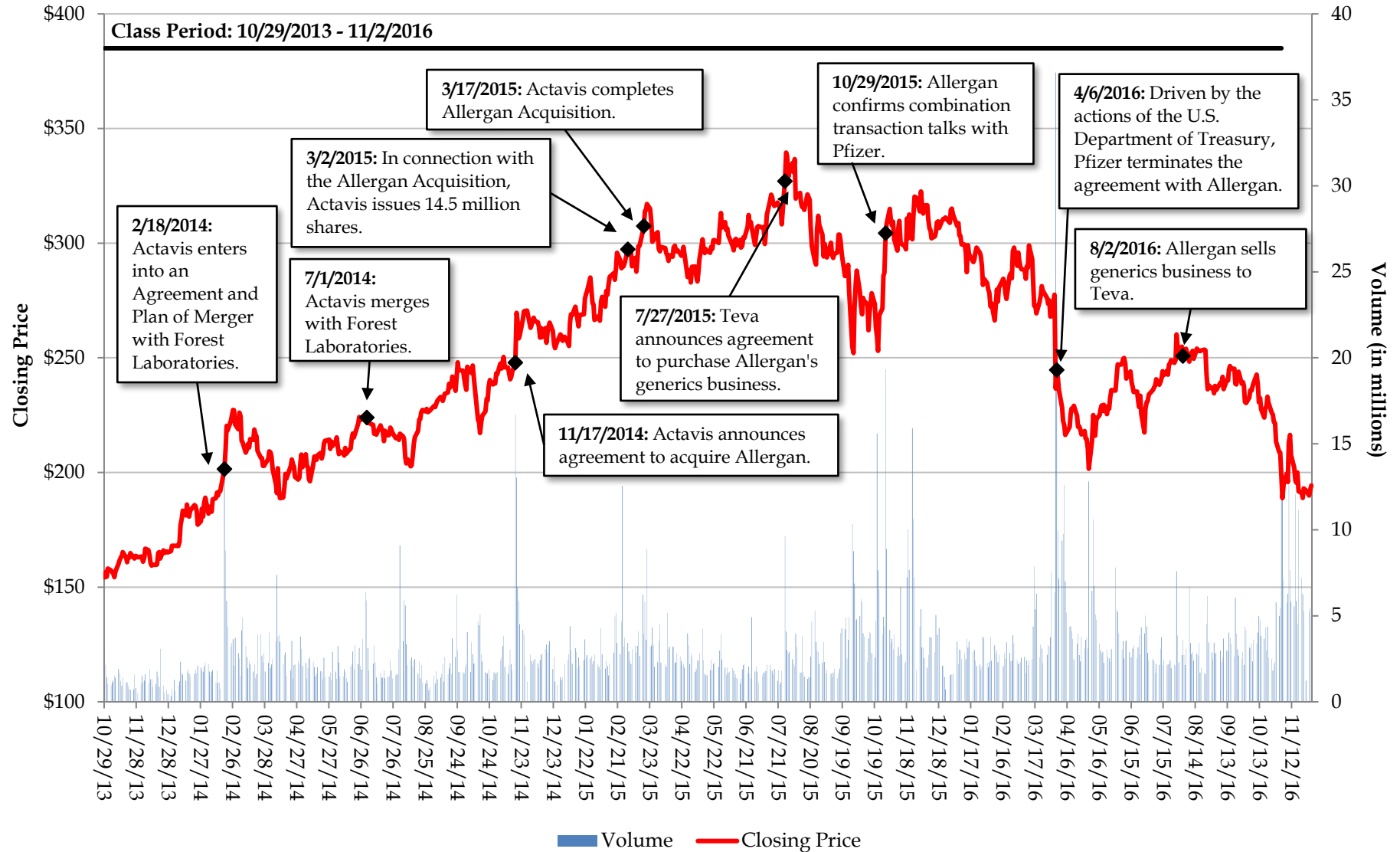
### Summary of Efficiency Factors for Allergan Common and Preferred Stock

Factor	Summary of Factor	Allergan Common Stock	Allergan Preferred Stock
Market Capitalization	Firms with a larger market capitalization tend to have "larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following."	<ul style="list-style-type: none"> <li>As of 12/31/2013, the market capitalization of the Allergan Common Stock was \$29.27 billion, which is at least the 96th percentile of all NYSE and NASDAQ stocks. Allergan Common Stock therefore easily meets this criterion.</li> </ul>	<ul style="list-style-type: none"> <li>As of 12/31/2016, the market capitalization of the Allergan Preferred Stock was \$3.86 billion, which is at least the 78th percentile of all NYSE and NASDAQ stocks. Allergan Preferred Stock therefore easily meets this criterion.</li> </ul>
Bid-Ask Spread	The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price.	<ul style="list-style-type: none"> <li>During the Class Period, the average percentage bid-ask spread for Allergan Common Stock in each month ranged from 0.013% to 0.078%. Allergan Common Stock's average percentage bid-ask spread was well below the mean and median bid-ask spread of a random sample of 100 other common stocks trading on the NASDAQ and NYSE in October 2015 (the full month when Allergan Common Stock had the largest bid-ask spread). This supports a finding of efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>During the Analysis Period, the average percentage bid-ask spread for Allergan Preferred Stock in each month ranged from 0.057% to 0.2%. Allergan Preferred Stock's average percentage bid-ask spread was well below the mean and median bid-ask spread of a random sample of 100 other common stocks trading on the NASDAQ and NYSE in October 2015 (the full month when Allergan Common Stock had the largest bid-ask spread and Allergan Preferred Stock had the second largest bid-ask spread). This supports a finding of efficiency.</li> </ul>
Float and Institutional Ownership	Institutional investors are considered to be sophisticated, well-informed investors with access to most publicly available information for the stocks that they own.	<ul style="list-style-type: none"> <li>On average, over 99% of Allergan shares were held by non-insiders. Also, 2,408 institutions held the vast majority of the public float throughout the Class Period which further supports the finding that Allergan Securities traded in an efficient market. There was limited institutional data for Allergan Preferred Stock.</li> </ul>	
Autocorrelation	If autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of the autocorrelation, it suggests market inefficiency because past price movements are not fully reflected in the current price.	<ul style="list-style-type: none"> <li>There was no evidence of statistically significant autocorrelation, which means that there was no systematic opportunity for a trader to profit from trading Allergan Common and Preferred Stock based solely on its past price movements. This supports a finding of efficiency.</li> </ul>	
Options	Empirical analysis has shown that option listings are associated with a decrease in bid-ask spread and increase in quoted depth, trading volume, trading frequency, and transaction size – an overall improvement of the market quality of the underlying stocks.	<ul style="list-style-type: none"> <li>There were 3,599,774 Allergan Common Stock put contracts and 5,124,037 Allergan Common Stock call contracts that traded during the Class Period. Allergan Common Stock therefore easily meets this criterion.</li> </ul>	



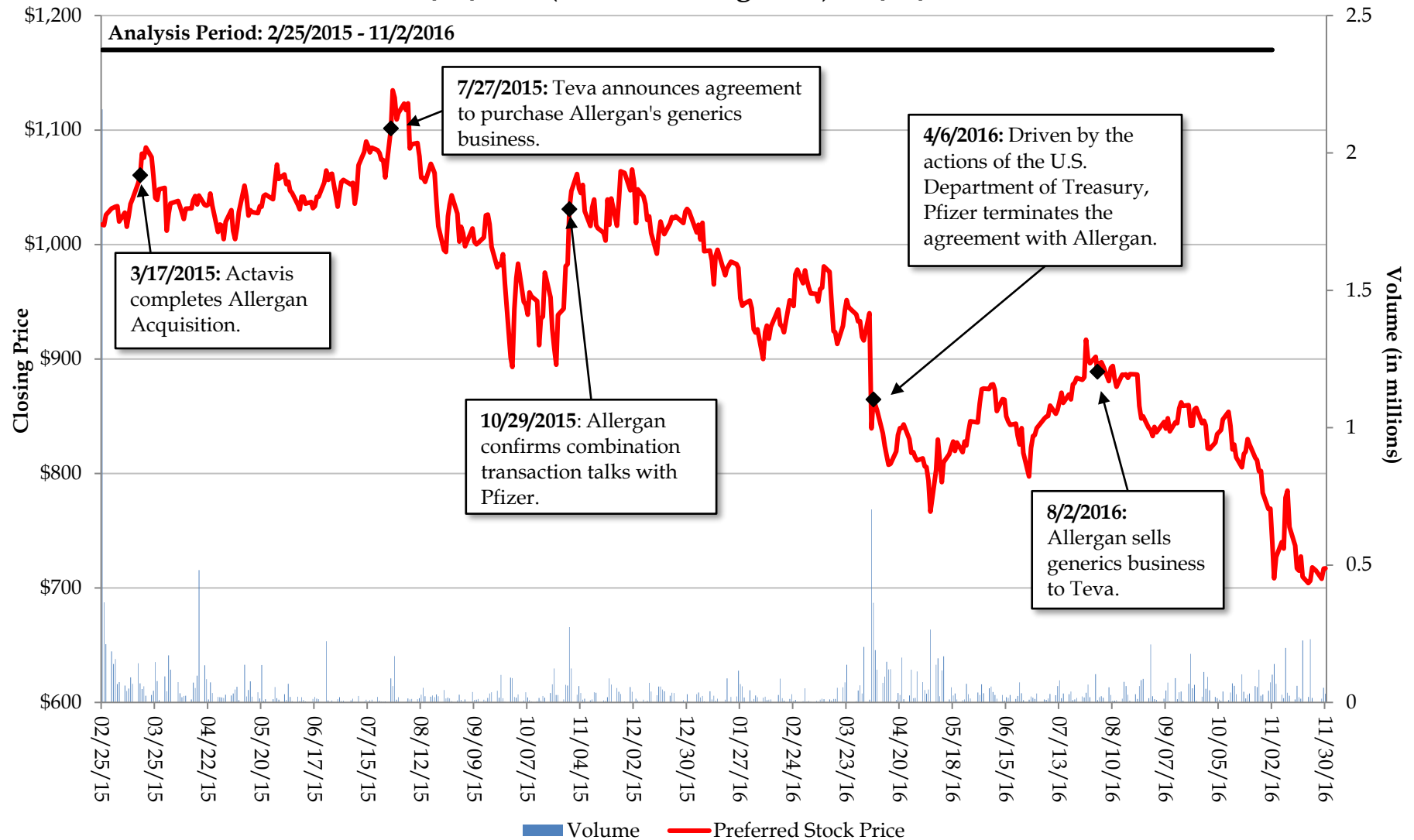
## Exhibit 2

### Allergan Common Stock Price & Volume 10/29/2013 - 11/30/2016



Sources: Complaint, Factiva Allergan SEC Filings, S&P Capital IQ.

**Exhibit 2-P**  
**Allergan Preferred Stock Price & Volume**  
**2/25/2015 (Initial Trading Date) - 11/30/2016**

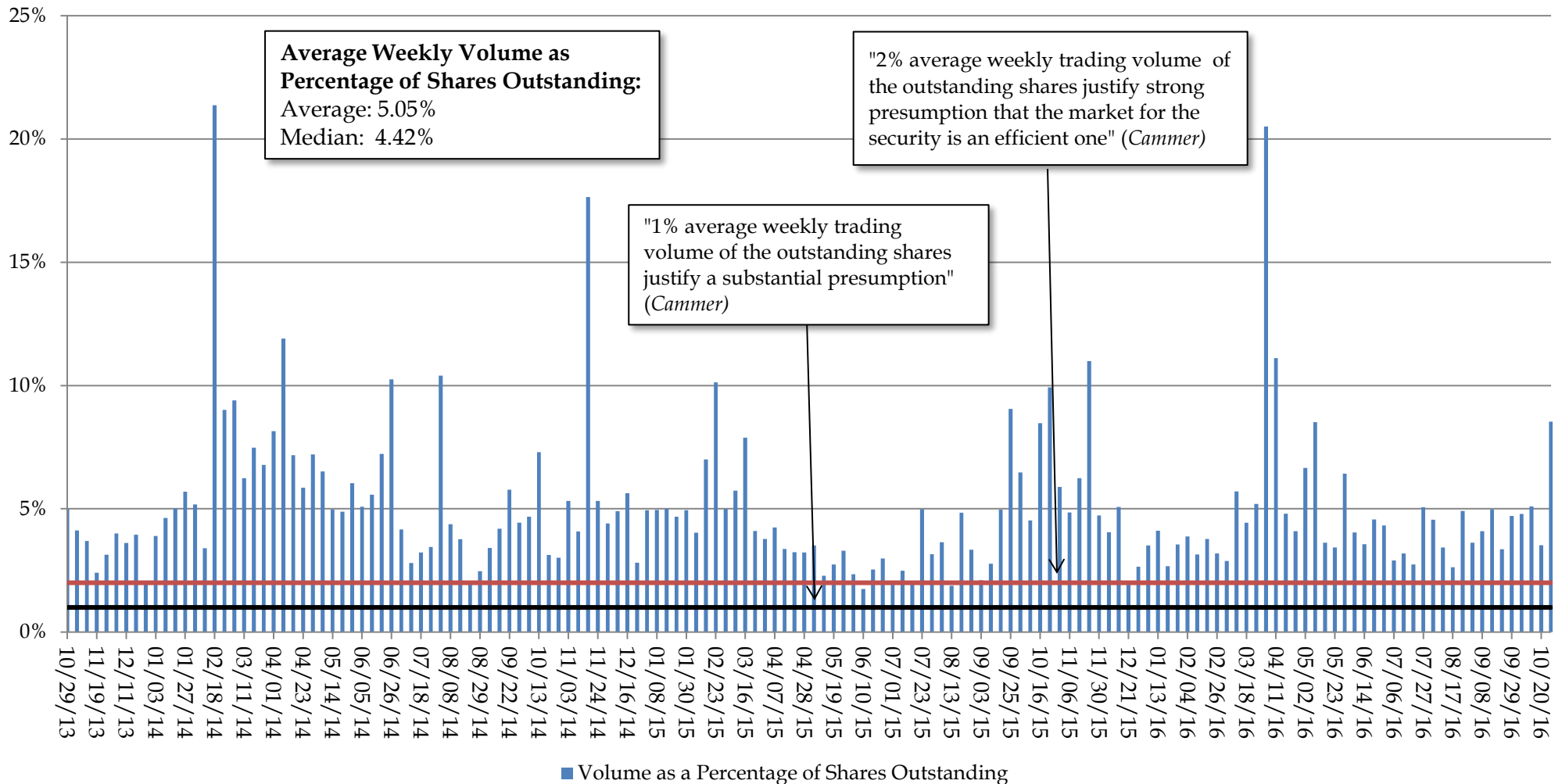


Sources: Complaint, Factiva, Allergan SEC Filings, S&P Capital IQ.

Note: On 2/24/2015, Allergan issued 5,060,000 shares of preferred stock.

### Exhibit 3

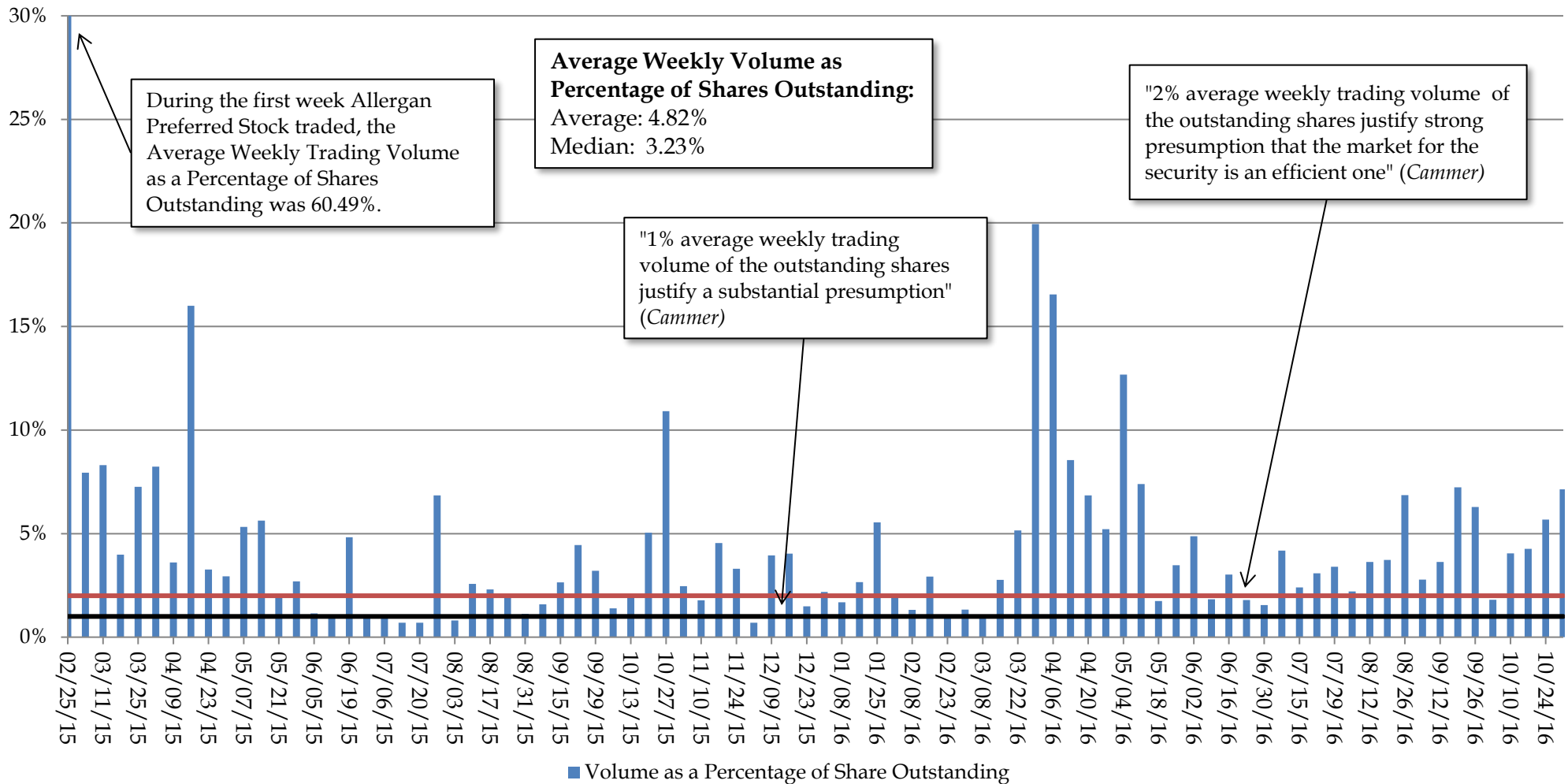
## Allergan Common Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding 10/29/2013 - 11/2/2016



Source: S&P Capital IQ.

Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on October 29, 2013 through November 2, 2016.

**Exhibit 3-P**  
**Allergan Preferred Stock Average Weekly Trading Volume**  
**as a Percentage of Shares Outstanding**  
**2/25/2015 (Initial Trading Date) - 11/2/2016**



Source: S&P Capital IQ.

Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the initial trading date after the preferred stock was issued (i.e. February 25, 2015) through November 2, 2016. The last week consists of three trading day (i.e. 10/31/2016, 11/1/2016, 11/2/2016), and therefore, the average of the daily trading volume on this day is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding.

### Exhibit 4

#### Summary of Securities Analyst Reports Issued for Allergan

Analyst Name		Reports Issued During the Class Period: 10/29/2013 - 11/2/2016
[1]	RBC CAPITAL MARKETS	86
[2]	MORNINGSTAR INC.	82
[3]	JPMORGAN	67
[4]	MORGAN STANLEY	64
[5]	EVERCORE ISI	59
[6]	UBS RESEARCH	51
[7]	GUGGENHEIM SECURITIES LLC	48
[8]	COWEN AND COMPANY	46
[9]	CORTELLIS COMPANY	45
[10]	WELLS FARGO SECURITIES, LLC	42
[11]	SVB LEERINK	41
[12]	BUCKINGHAM RESEARCH GROUP, INC.	38
[13]	PIPER SANDLER COMPANIES	31
[14]	STERNEAGEE CRT	30
[15]	SUSQUEHANNA FINANCIAL GROUP LLLP	28
[16]	BMO CAPITAL MARKETS	24
[17]	CFRA EQUITY RESEARCH	23
[18]	GABELLI & COMPANY	22
[19]	DEUTSCHE BANK	21
[20]	BARCLAYS	19
[21]	SADIF ANALYTICS	19
[22]	WRIGHT INVESTORS SERVICE	19
[23]	CANACCORD GENUITY	16
[24]	GLOBALDATA	16
[25]	MARKETLINE	13
[26]	ADDITIONAL ANALYSTS <sup>1</sup>	54
<b>Total</b>		<b>1004</b>

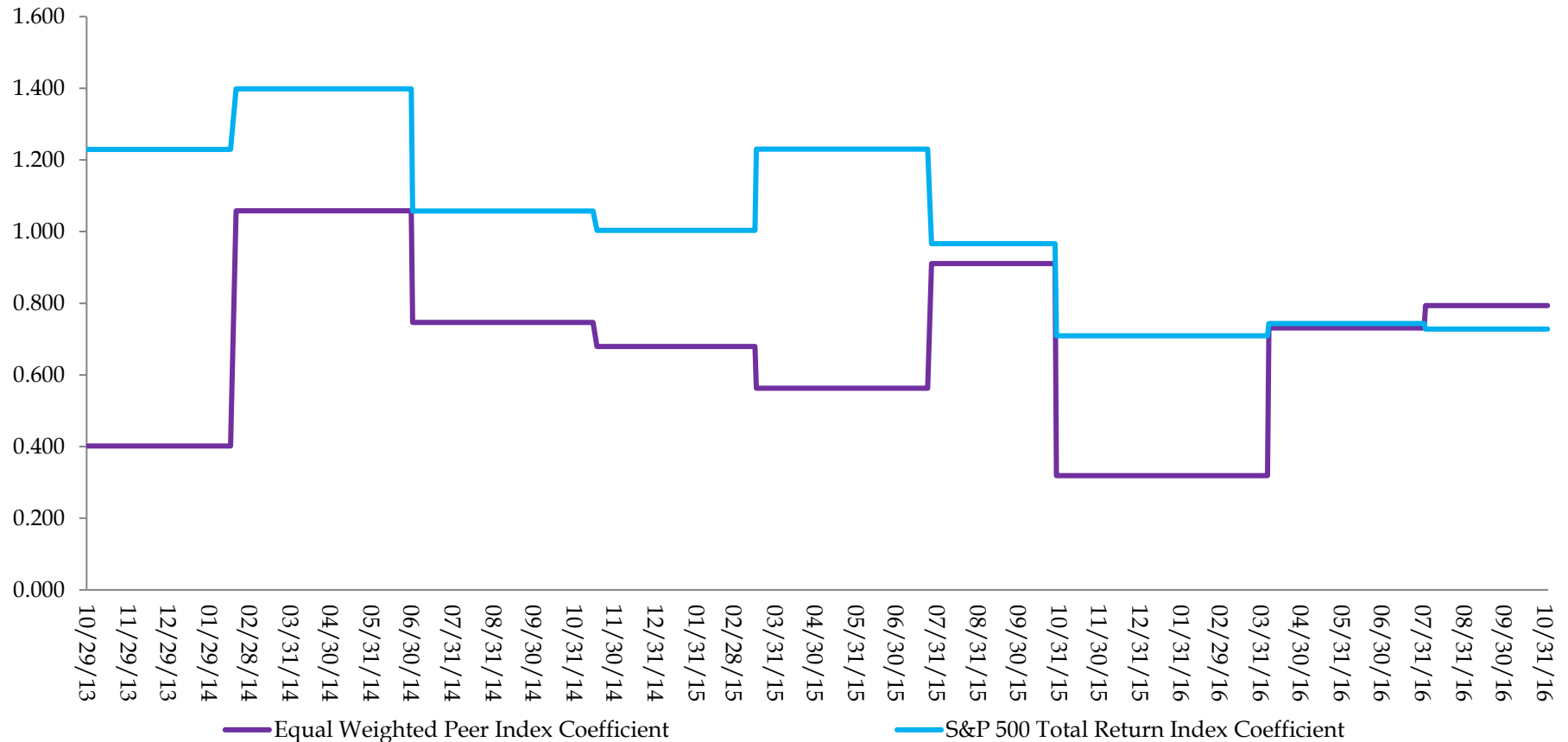
Source: Investext.

(1) Not listed are 16 additional analysts that filed fewer than 10 reports each during the Class Period.

(2) Additionally, many analyst reports are not available through third party data providers (e.g. Investext); therefore, this almost certainly understates the total amount of analyst coverage. For example, analysts for Goldman Sachs Group Inc., Bank of America, and Needham & Company, LLC were present on earnings calls during the Class Period.

## Exhibit 5

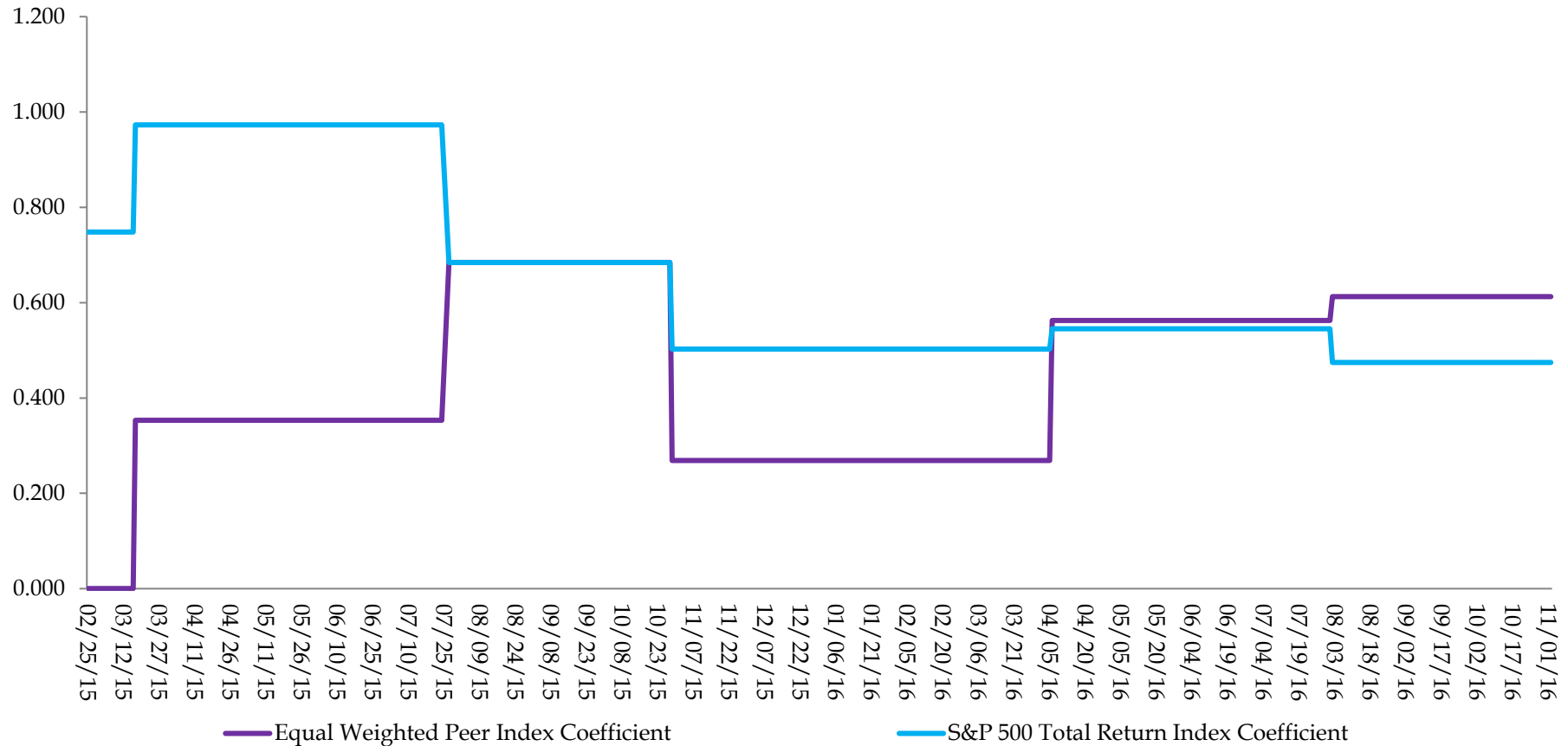
### Coefficients from Event Study Regressions for Allergan Common Stock 10/29/2013 - 11/2/2016



Note: The results are based upon 9 fixed regressions over the Class Period. The regressions control for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Class Period. Companies while under merger consideration with Allergan are removed from the Peer Index. I employed 9 discrete estimation windows to address the fact that the return generating process of Allergan Common Stock was impacted by the various merger, acquisition, and divestiture announcements, which I refer to as Corporate Action Events, during the Class Period. The 9 different estimation windows are outlined in Section F.1 of my report. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates have been removed from estimation. The outlier dates include 11/18/2014, continued reaction to Actavis's acquisition announcement of Allergan; 7/27/2015, Teva announces agreement to purchase Allergan's generics business; and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

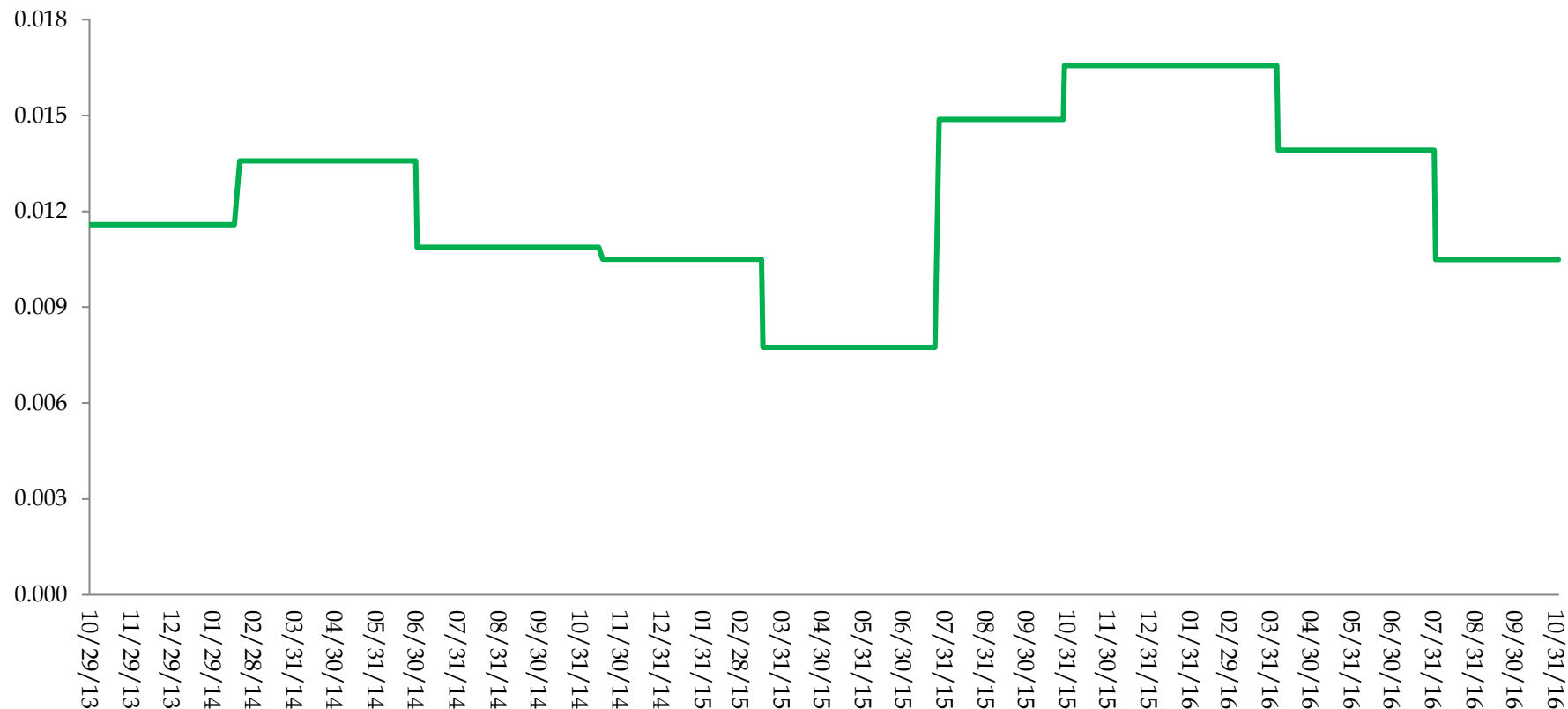
### Exhibit 5-P

#### Coefficients from Event Study Regressions for Allergan Preferred Stock 2/25/2015 (Initial Trading Date) - 11/2/2016



Note: The results are based upon 6 fixed regressions over the Analysis Period. The regressions control for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Analysis Period. Companies while under merger consideration with Allergan are removed from the Peer Index. I employed 6 discrete estimation windows to address the fact that the return generating process of Allergan Preferred Stock was impacted by the various merger, acquisition, and divestiture announcements, which I refer to as Corporate Action Events, during the Analysis Period. The 6 different estimation windows are outlined in Section F.2 of my report. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates have been removed from estimation. The outlier dates include 7/27/2015, Teva announces agreement to purchase Allergan's generics business and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

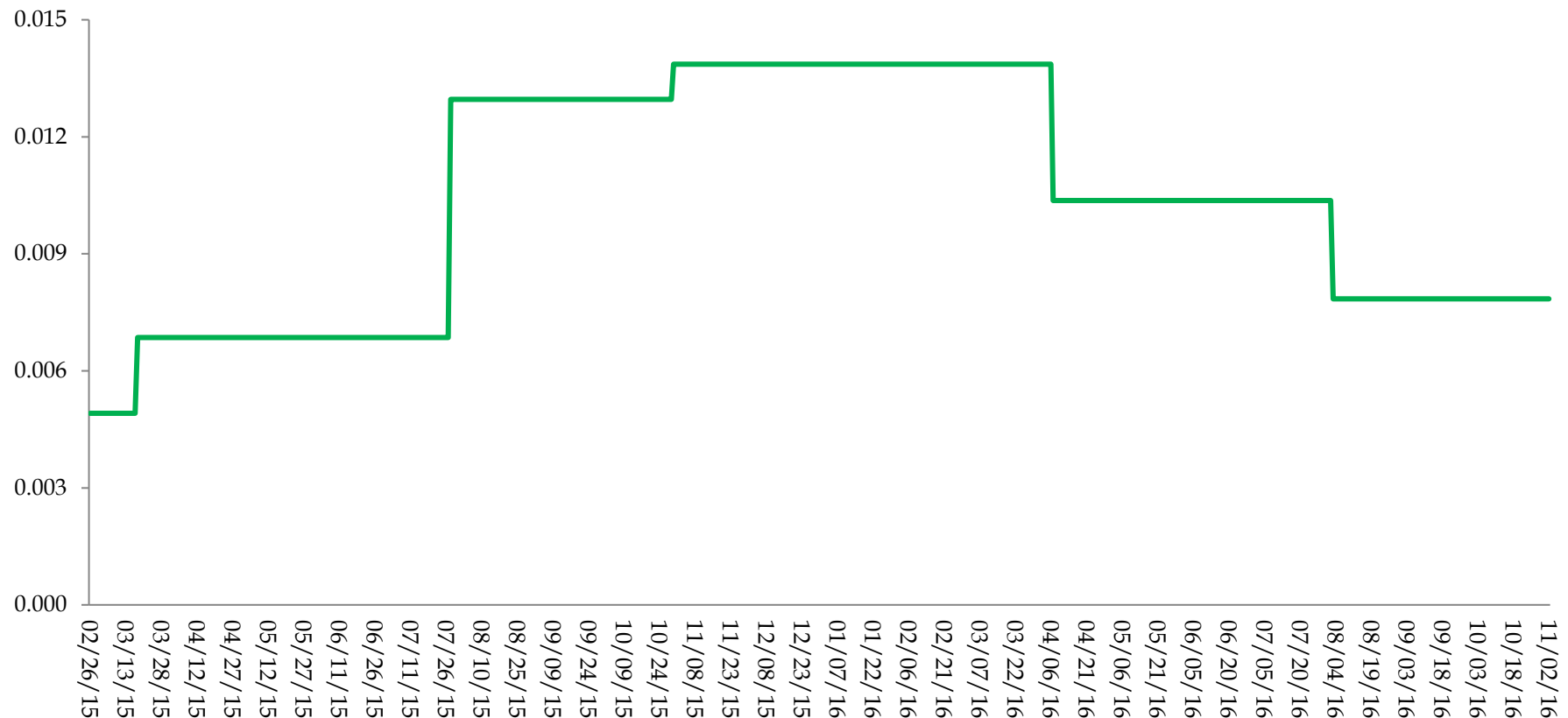
**Exhibit 6**  
**Standard Deviation of the Errors for Event Study**  
**Regressions for Allergan Common Stock**  
**10/29/2013 - 11/2/2016**



Note: The results are based upon 9 fixed regressions over the Class Period. The regressions control for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Class Period. Companies while under merger consideration with Allergan are removed from the Peer Index. I employed 9 discrete estimation windows to address the fact that the return generating process of Allergan Common Stock was impacted by the various merger, acquisition, and divestiture announcements, which I refer to as Corporate Action Events, during the Class Period. The 9 different estimation windows are outlined in Section F.1 of my report. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates have been removed from estimation. The outlier dates include 11/18/2014, continued reaction to Actavis's acquisition announcement of Allergan; 7/27/2015, Teva announces agreement to purchase Allergan's generics business; and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.



**Exhibit 6-P**  
**Standard Deviation of the Errors for Event Study**  
**Regressions for Allergan Preferred Stock**  
**2/25/2015 (Initial Trading Date) - 11/2/2016**



Note: The results are based upon 6 fixed regressions over the Analysis Period. The regressions control for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Analysis Period. Companies while under merger consideration with Allergan are removed from the Peer Index. I employed 6 discrete estimation windows to address the fact that the return generating process of Allergan Preferred Stock was impacted by the various merger, acquisition, and divestiture announcements, which I refer to as Corporate Action Events, during the Analysis Period. The 6 different estimation windows are outlined in Section F.2 of my report. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates have been removed from estimation. The outlier dates include 7/27/2015, Teva announces agreement to purchase Allergan's generics business and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

**Exhibit 7**  
**Event Study Analysis of Allergan Earnings Announcements for Common Stock**

#	Date	Time	Market Date	Event	Headline	Closing Price	Raw Return	Regression Models			
								Abnormal Return	Abnormal Dollar Change	t-Stat	Sig Level
1	10/29/2013	7:00 AM	10/29/2013	Q3 2013 Earnings	Actavis Net Revenue Increases 57% to \$2.01 Billion in Third Quarter 2013; Non-GAAP EPS Increases 55% to \$2.09 <i>Source -PRNewswire</i>	\$154.27	5.77%	5.12%	\$7.47	4.42	***
2	1/14/2014	8:00 AM	1/14/2014	FY 2013 Pre-Announcement	Actavis Announces Preliminary Financial Performance for FY 2013 <i>Source - PRNewswire</i>	\$186.00	2.60%	0.92%	\$1.67	0.79	
3	2/20/2014	7:00 AM	2/20/2014	Q4 2013 Earnings	Actavis Net Revenue Increases 59% to \$2.779 Billion in Fourth Quarter 2013; Non-GAAP EPS Increases 99% to \$3.17 <i>Source -PRNewswire</i>	\$220.37	4.66%	2.76%	\$5.80	2.03	**
4	4/30/2014	7:00 AM	4/30/2014	Q1 2014 Earnings	Actavis Net Revenue Increases 40% to \$2.66 Billion in First Quarter 2014; Non-GAAP EPS Increases 75% to \$3.49 <i>Source -PRNewswire</i>	\$204.33	3.30%	2.83%	\$5.59	2.08	**
5	8/5/2014	7:00 AM	8/5/2014	Q2 2014 Earnings	Actavis Net Revenue Increases 34% to \$2.67 Billion in Second Quarter 2014; Non-GAAP EPS Increases 70% to \$3.42 <i>Source -PRNewswire</i>	\$214.67	-0.51%	0.24%	\$0.52	0.22	
6	11/5/2014	6:30 AM	11/5/2014	Q3 2014 Earnings	Actavis Net Revenue Increases 83% to \$3.7 Billion in Third Quarter 2014; Non-GAAP EPS Increases 53% to \$3.19 <i>Source -PRNewswire</i>	\$247.91	1.06%	1.27%	\$3.10	1.16	
7	1/12/2015	8:30 AM	1/12/2015	Q4 2014 Pre-Announcement	Actavis Announces Exceptional Preliminary Fourth Quarter 2014 Performance <i>Source -PRNewswire</i>	\$272.28	1.34%	1.93%	\$5.20	1.84	*
8	2/18/2015	6:30 AM	2/18/2015	Q4 2014 Earnings	Actavis Non-GAAP Net Revenue Increases 44% to \$4 Billion in Fourth Quarter 2014; Non-GAAP EPS Increases 23% to \$3.91; Increases 2015 Standalone Forecast <i>Source -PRNewswire</i>	\$284.00	-1.01%	-0.79%	-\$2.28	-0.76	
9	5/11/2015	6:30 AM	5/11/2015	Q1 2015 Earnings	Actavis Reports Exceptional Performance in First Quarter 2015 with 59% Increase in Net Revenue to \$4.2 Billion and 23% Growth in Non-GAAP EPS to \$4.30 <i>Source -PRNewswire</i>	\$301.74	3.05%	3.17%	\$9.28	4.10	***
10	8/6/2015	7:00 AM	8/6/2015	Q2 2015 Earnings	Allergan Reports Exceptional Second Quarter 2015 Performance with 116% Increase in Net Revenue to \$5.76 Billion and 29% Growth in Non-GAAP EPS to \$4.41 <i>Source -PRNewswire</i>	\$319.47	-5.10%	-3.24%	-\$10.91	-2.18	**

### Exhibit 7

#### Event Study Analysis of Allergan Earnings Announcements for Common Stock

#	Date	Time	Market Date	Event	Headline	Closing Price	Raw Return	Regression Models			
								Abnormal Return	Abnormal Dollar Change	t-Stat	Sig Level
11	11/4/2015	7:30 AM	11/4/2015	Q3 2015 Earnings	Allergan Reports Exceptional Third Quarter 2015 Continuing Operations Performance with 90% Increase in Net Revenue to \$4.1 Billion and 65% Growth in Non-GAAP EPS to \$3.48 <i>Source -PRNewswire</i>	\$307.67	-0.53%	-0.31%	-\$0.96	-0.19	
12	2/22/2016	7:30 AM	2/22/2016	Q4 2015 Earnings	Allergan Reports Exceptional Fourth Quarter 2015 Continuing Operations Performance with 74% Increase in Net Revenue to \$4.2 Billion and 33% Growth in Non-GAAP Diluted EPS to \$3.41 <i>Source -PRNewswire</i>	\$285.82	3.65%	2.97%	\$8.18	1.79	*
13	5/10/2016	7:30 AM	5/10/2016	Q1 2016 Earnings	Allergan Reports Strong First Quarter 2016 Continuing Operations Performance with 48% Increase in Net Revenue to \$3.8 Billion and 15% Growth in Non-GAAP Diluted EPS to \$3.04 <i>Source -PRNewswire</i>	\$225.00	5.28%	4.19%	\$8.96	3.01	***
14	8/8/2016	7:00AM	8/8/2016	Q2 2016 Earnings	Allergan Reports Strong Second Quarter 2016 Continuing Operations Performance with Net Revenues of \$3.7 Billion <i>Source -PRNewswire</i>	\$248.31	-2.18%	-1.63%	-\$4.14	-1.56	
15	11/2/2016	6:35 AM	11/2/2016	Q3 2016 Earnings	Allergan Reports Third Quarter 2016 Continuing Operations Performance with GAAP Net Revenues of \$3.6 Billion; Announces Accelerated Share Repurchase, Initiation of Cash Dividend <i>Source -PRNewswire</i>	\$197.89	-5.16%	-4.40%	-\$9.18	-4.20	***

Sources: S&P Capital IQ and Factiva.

Notes:

(1) The results are based upon 9 fixed regressions over the Class Period. The regressions control for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Class Period. Companies while under merger consideration with Allergan are removed from the Peer Index. I employed 9 discrete estimation windows to address the fact that the return generating process of Allergan Common Stock was impacted by the various merger, acquisition, and divestiture announcements, which I refer to as Corporate Action Events, during the Class Period. The 9 different estimation windows are outlined in Section F.1 of my report. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates have been removed from estimation. The outlier dates include 11/18/2014, continued reaction to Actavis's acquisition announcement of Allergan; 7/27/2015, Teva announces agreement to purchase Allergan's generics business; and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

(2) "\*\*\*\*" Denotes statistical significance at the 99% confidence level or greater. "\*\*\*" Denotes statistical significance at the 95% confidence level or greater. "\*\*" Denotes statistical significance at the 90% confidence level or greater.

### Exhibit 7-P

#### Event Study Analysis of Allergan Earnings Announcements for Preferred Stock

#	Date	Time	Market Date	Event	Headline	Closing Price	Raw Return	Regression Models			
								Abnormal Return	Abnormal Dollar Change	t-Stat	Sig Level
1	5/11/2015	6:30 AM	5/11/2015	Q1 2015 Earnings	Actavis Reports Exceptional Performance in First Quarter 2015 with 59% Increase in Net Revenue to \$4.2 Billion and 23% Growth in Non-GAAP EPS to \$4.30 <i>Source -PRNewswire</i>	\$1,051.50	2.26%	2.42%	\$24.93	3.54	***
2	8/6/2015	7:00 AM	8/6/2015	Q2 2015 Earnings	Allergan Reports Exceptional Second Quarter 2015 Performance with 116% Increase in Net Revenue to \$5.76 Billion and 29% Growth in Non-GAAP EPS to \$4.41 <i>Source -PRNewswire</i>	\$1,084.00	-3.49%	-2.11%	-\$23.75	-1.63	
3	11/4/2015	7:30 AM	11/4/2015	Q3 2015 Earnings	Allergan Reports Exceptional Third Quarter 2015 Continuing Operations Performance with 90% Increase in Net Revenue to \$4.1 Billion and 65% Growth in Non-GAAP EPS to \$3.48 <i>Source -PRNewswire</i>	\$1,044.96	-0.38%	-0.23%	-\$2.39	-0.16	
4	2/22/2016	7:30 AM	2/22/2016	Q4 2015 Earnings	Allergan Reports Exceptional Fourth Quarter 2015 Continuing Operations Performance with 74% Increase in Net Revenue to \$4.2 Billion and 33% Growth in Non-GAAP Diluted EPS to \$3.41 <i>Source -PRNewswire</i>	\$951.30	3.02%	2.57%	\$23.75	1.86	*
5	5/10/2016	7:30 AM	5/10/2016	Q1 2016 Earnings	Allergan Reports Strong First Quarter 2016 Continuing Operations Performance with 48% Increase in Net Revenue to \$3.8 Billion and 15% Growth in Non-GAAP Diluted EPS to \$3.04 <i>Source -PRNewswire</i>	\$829.72	3.33%	2.48%	\$19.92	2.39	**
6	8/8/2016	7:00AM	8/8/2016	Q2 2016 Earnings	Allergan Reports Strong Second Quarter 2016 Continuing Operations Performance with Net Revenues of \$3.7 Billion <i>Source -PRNewswire</i>	\$880.80	-1.47%	-1.06%	-\$9.45	-1.35	
7	11/2/2016	6:35 AM	11/2/2016	Q3 2016 Earnings	Allergan Reports Third Quarter 2016 Continuing Operations Performance with GAAP Net Revenues of \$3.6 Billion; Announces Accelerated Share Repurchase, Initiation of Cash Dividend <i>Source -PRNewswire</i>	\$738.48	-4.00%	-3.48%	-\$26.78	-4.44	***

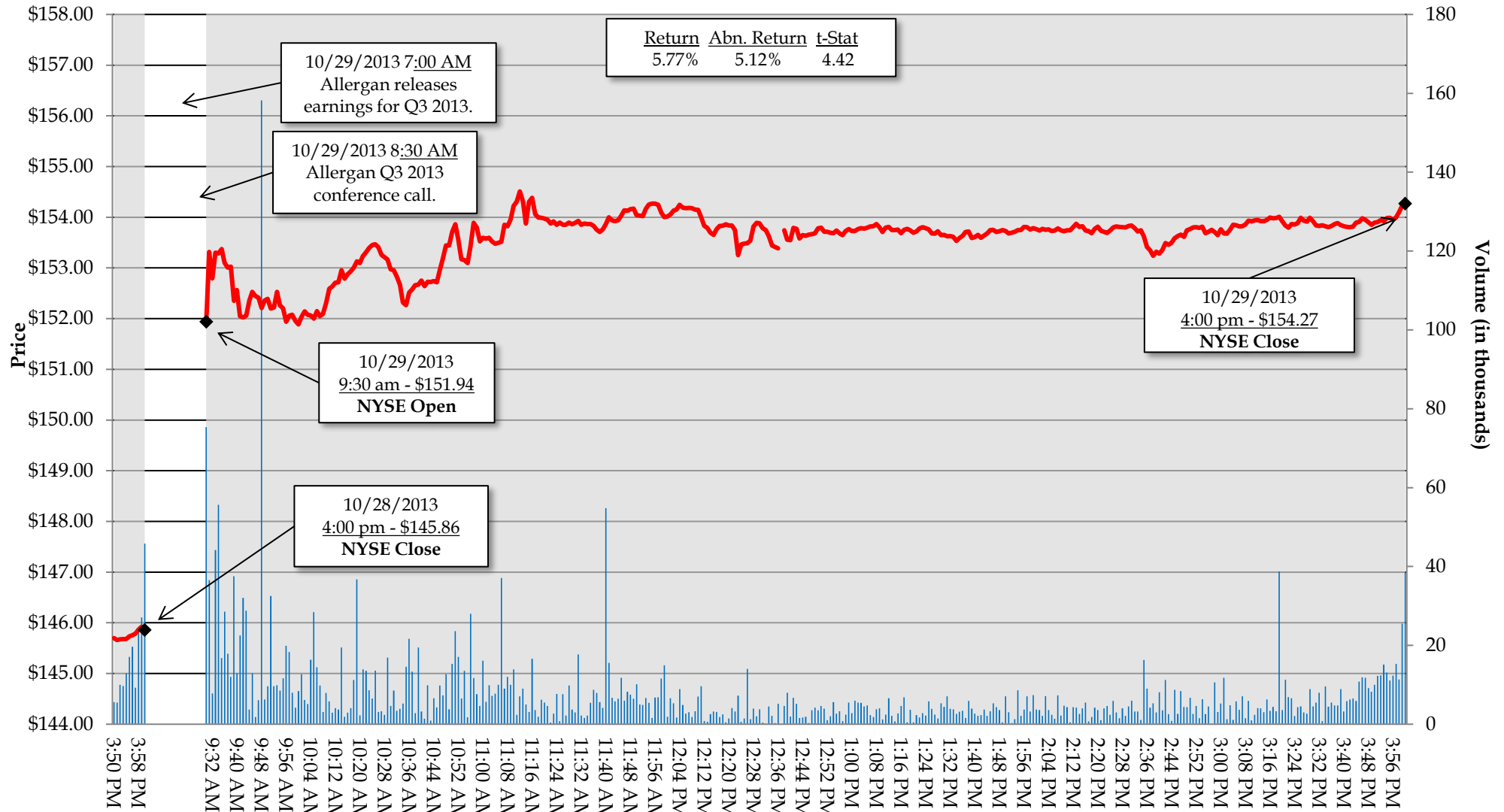
Sources: S&P Capital IQ and Factiva.

Notes:

(1) The results are based upon 6 fixed regressions over the Analysis Period. The regressions control for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Analysis Period. Companies while under merger consideration with Allergan are removed from the Peer Index. I employed 6 discrete estimation windows to address the fact that the return generating process of Allergan Preferred Stock was impacted by the various merger, acquisition, and divestiture announcements, which I refer to as Corporate Action Events, during the Analysis Period. The 6 different estimation windows are outlined in Section F.2 of my report. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates have been removed from estimation. The outlier dates include 7/27/2015, Teva announces agreement to purchase Allergan's generics business and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

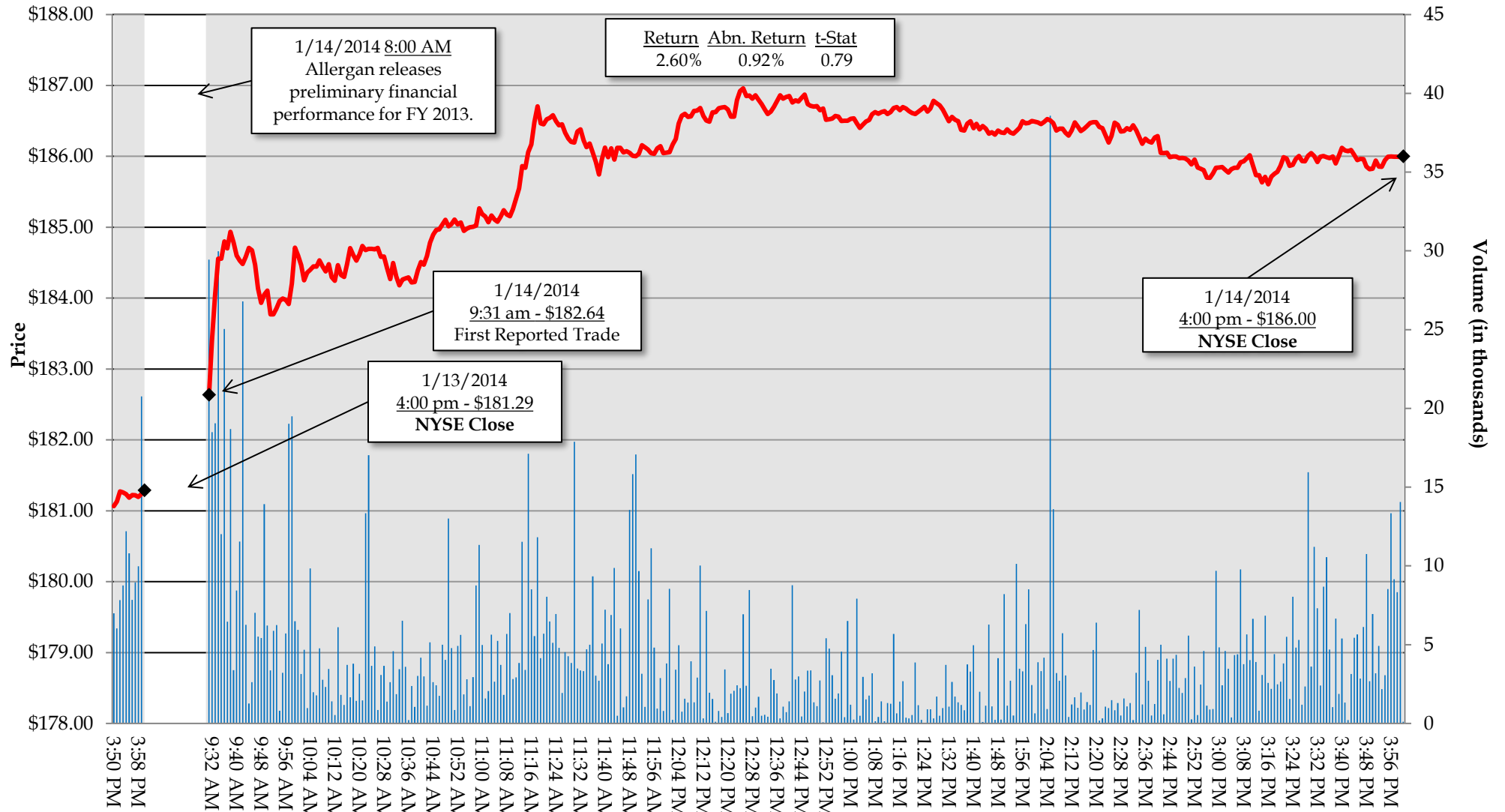
(2) "\*\*\*\*" Denotes statistical significance at the 99% confidence level or greater. "\*\*\*" Denotes statistical significance at the 95% confidence level or greater. "\*\*" Denotes statistical significance at the 90% confidence level or greater.

**Exhibit 8A**  
**Allergan Common Stock Intraday Price and Volume**  
**10/29/2013**



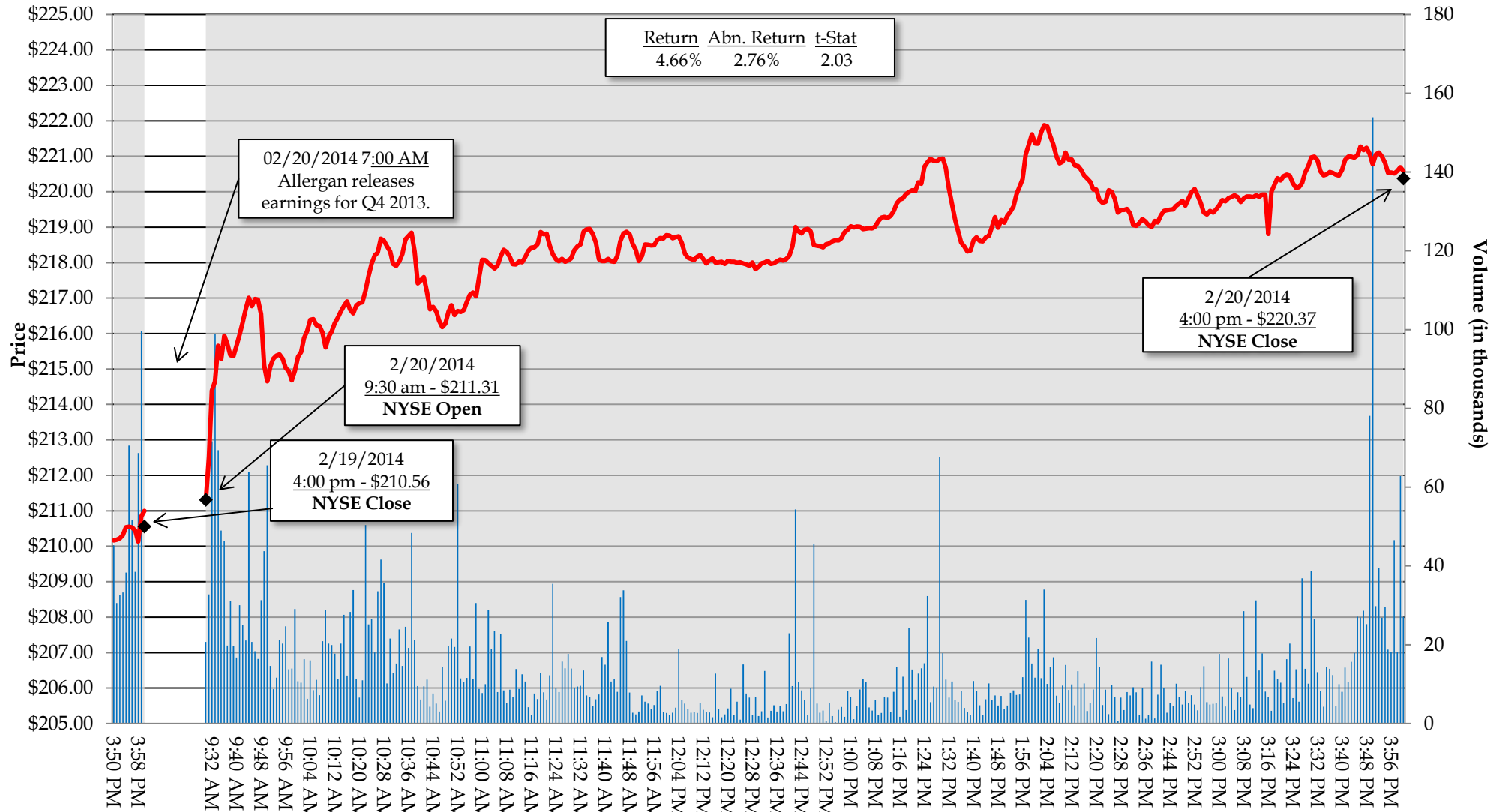
Source: TICK Data.

**Exhibit 8B**  
**Allergan Common Stock Intraday Price and Volume**  
**1/14/2014**



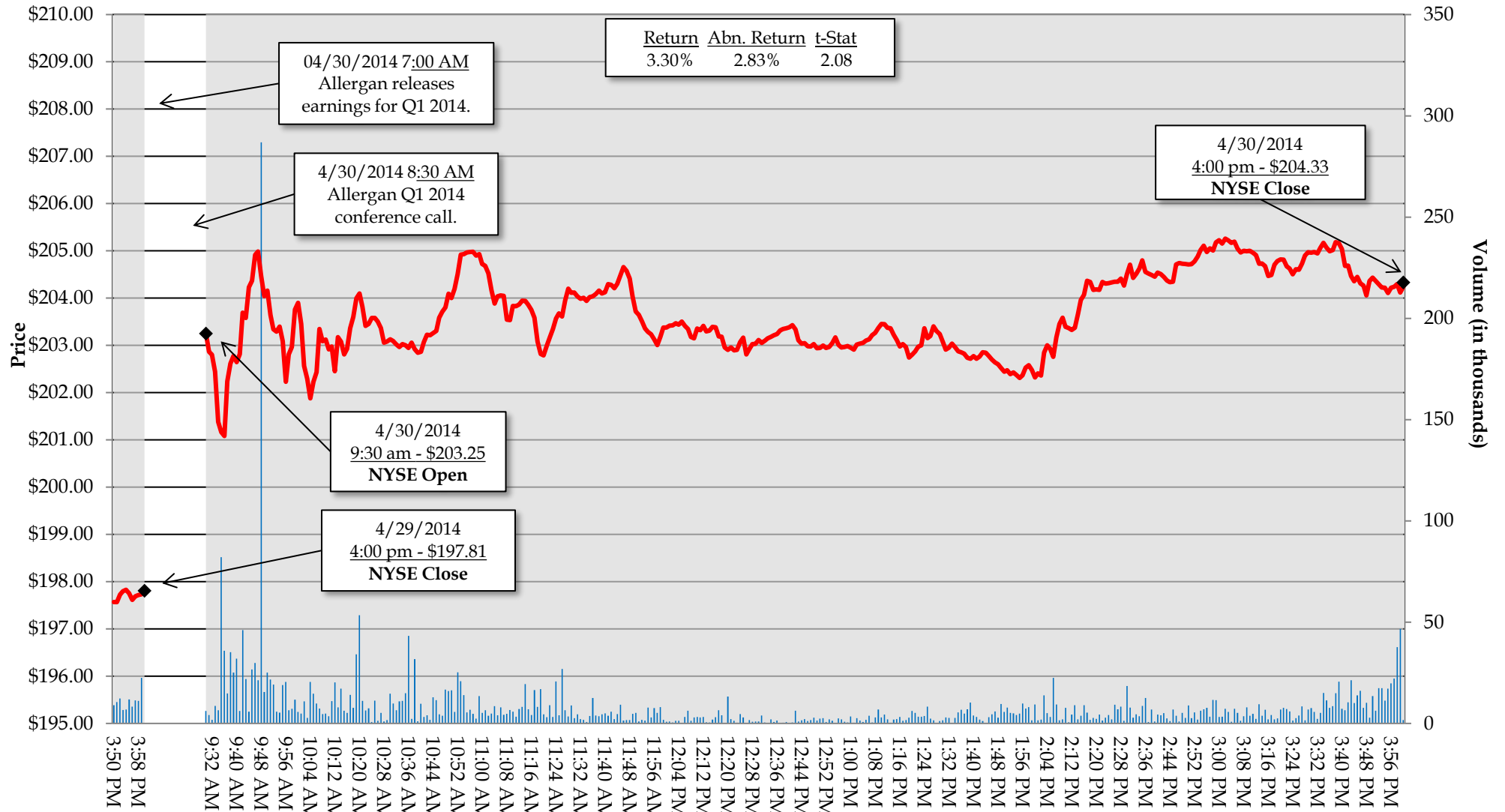
Source: TICK Data.

**Exhibit 8C**  
**Allergan Common Stock Intraday Price and Volume**  
**2/20/2014**



Source: TICK Data.

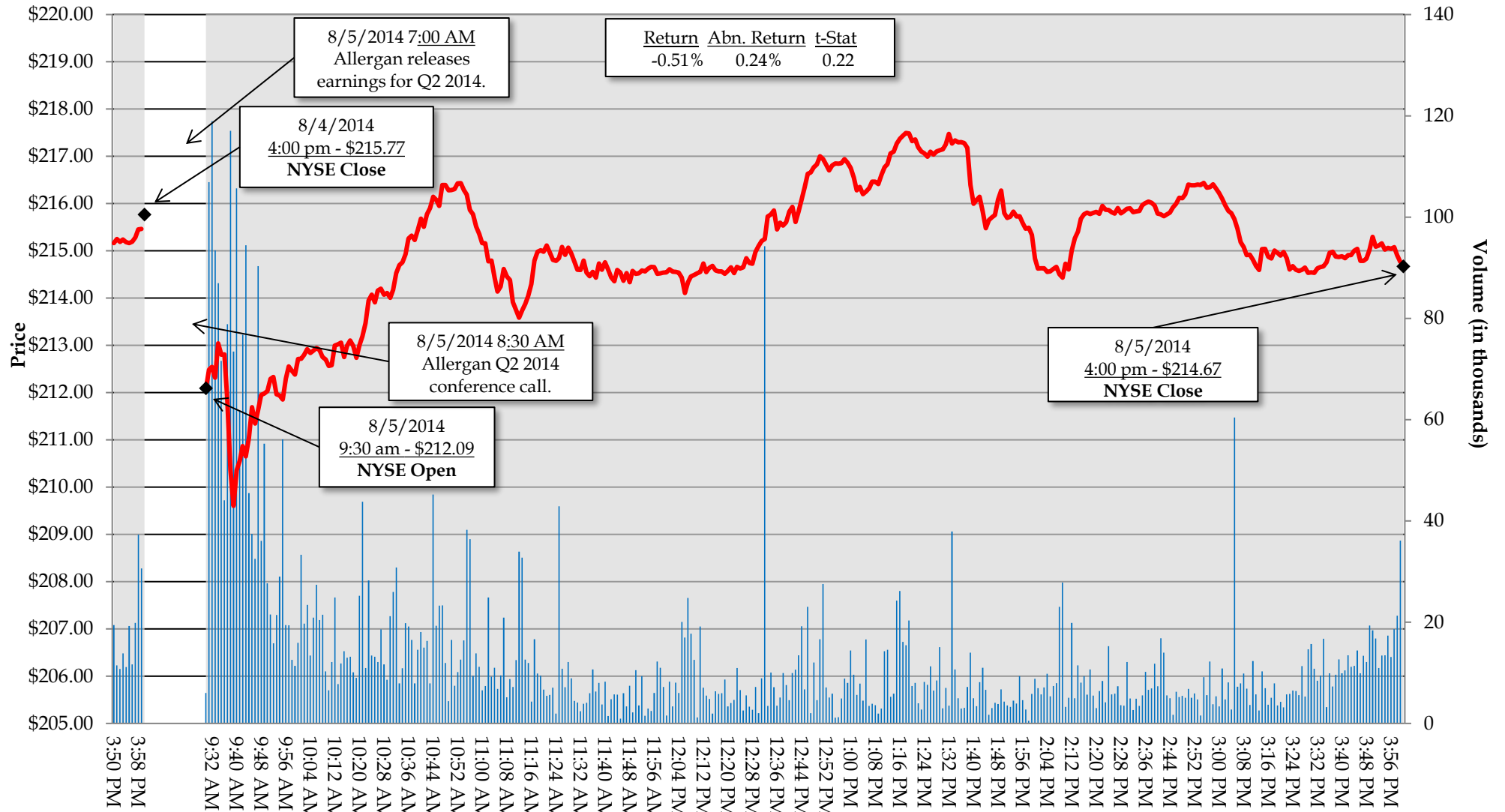
**Exhibit 8D**  
**Allergan Common Stock Intraday Price and Volume**  
**4/30/2014**



Source: TICK Data.

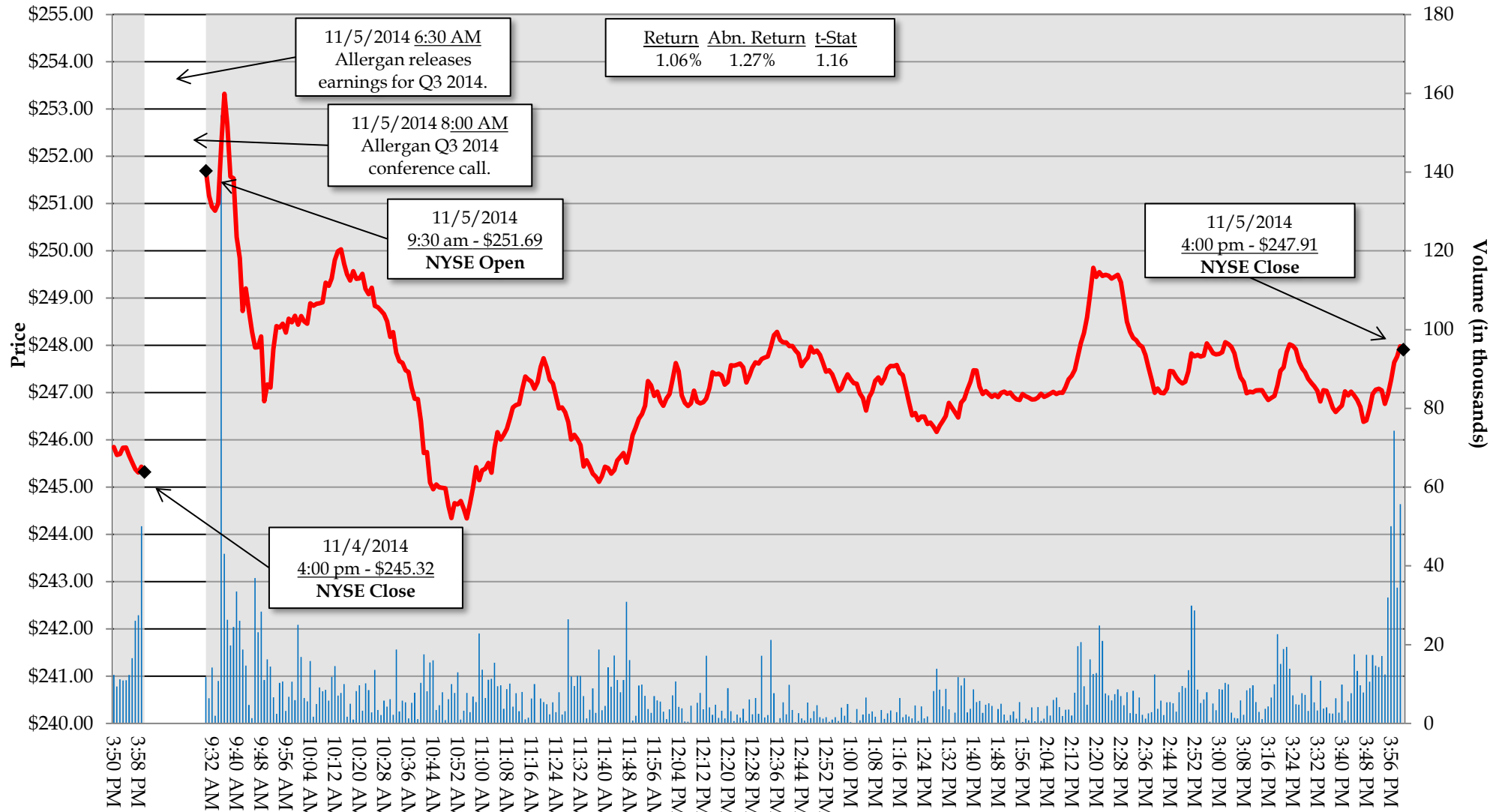


**Exhibit 8E**  
**Allergan Common Stock Intraday Price and Volume**  
**8/5/2014**



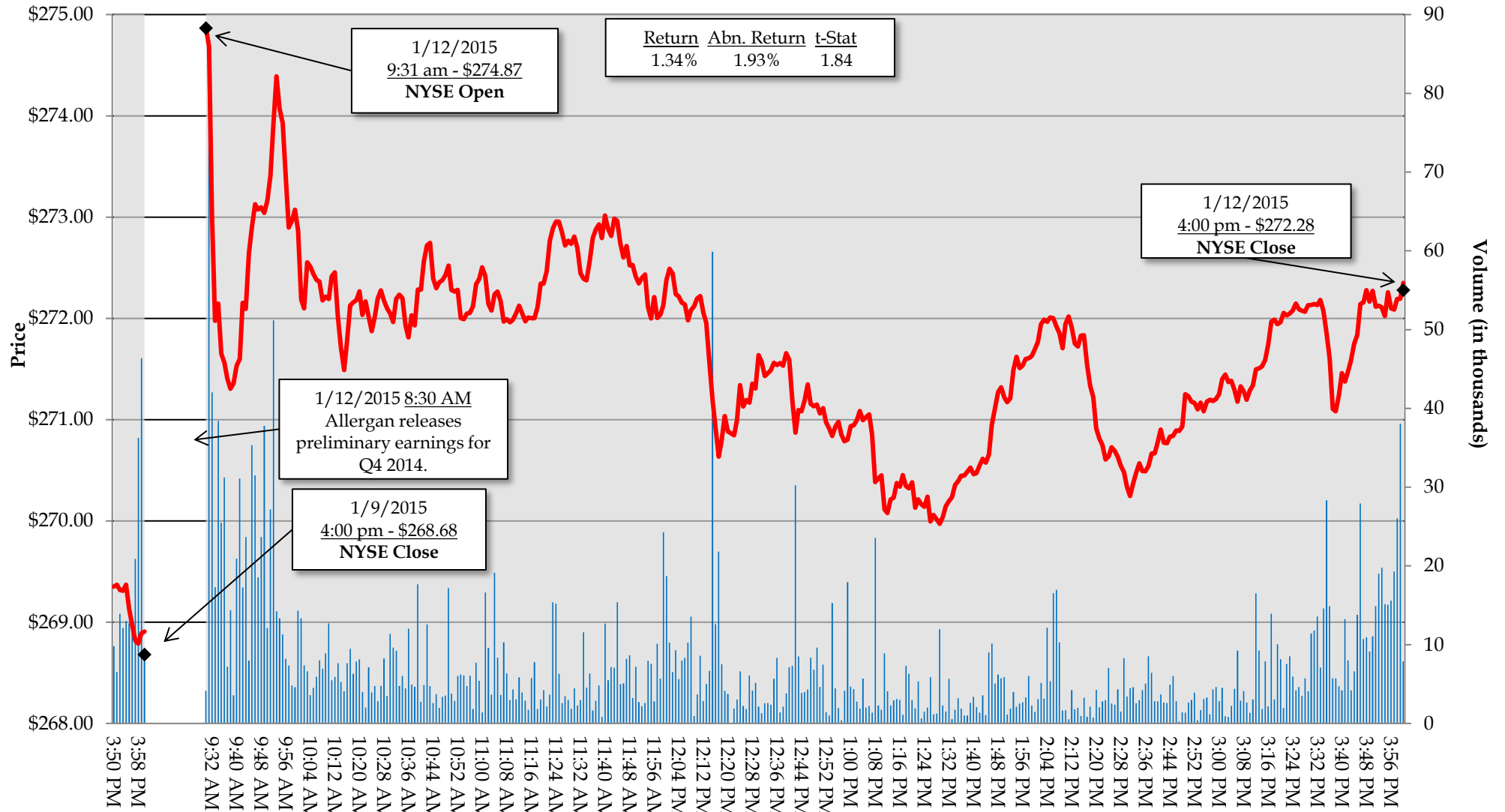
Source: TICK Data.

**Exhibit 8F**  
**Allergan Common Stock Intraday Price and Volume**  
**11/5/2014**



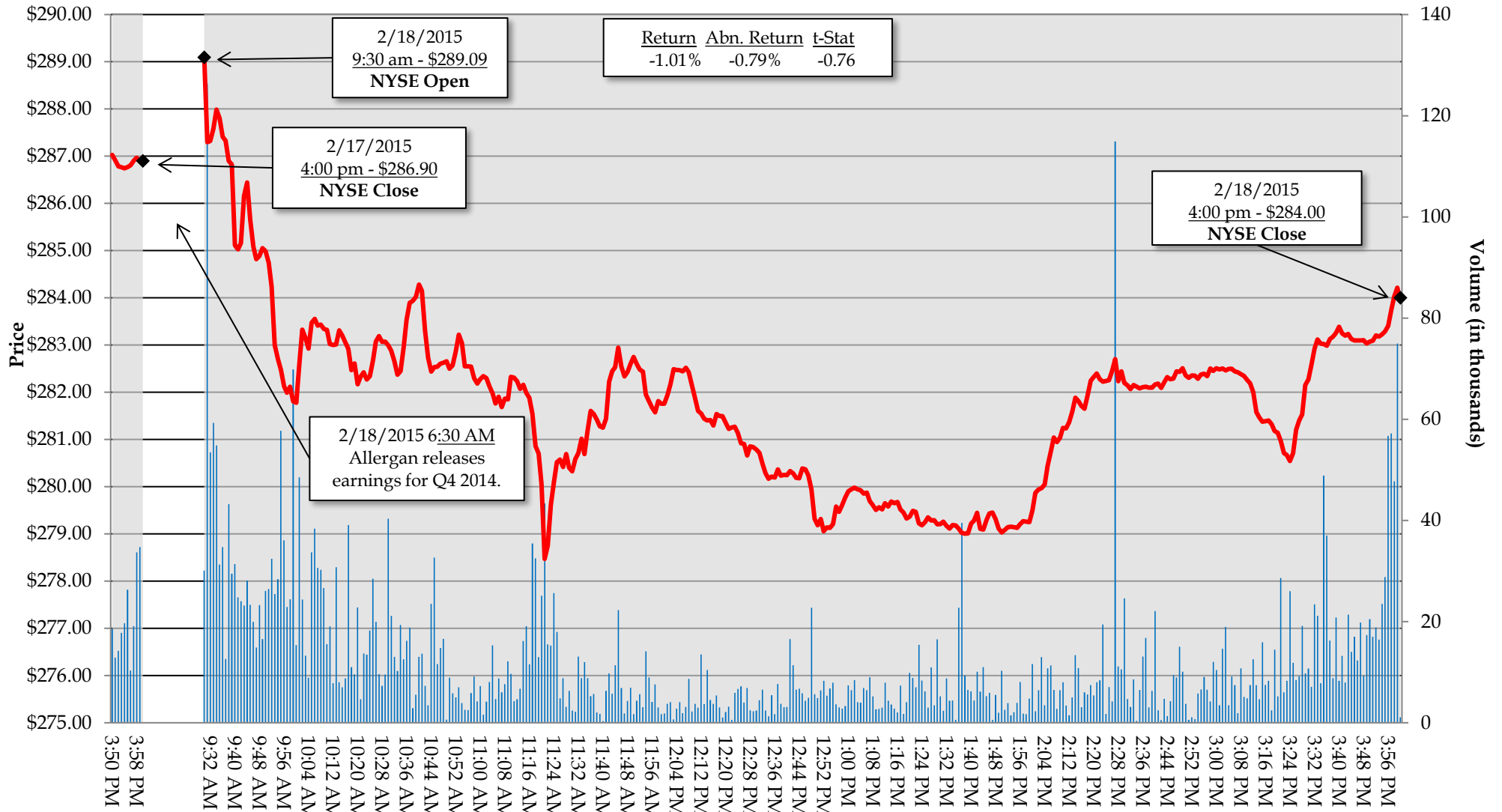
Source: TICK Data.

**Exhibit 8G**  
**Allergan Common Stock Intraday Price and Volume**  
**1/12/2015**



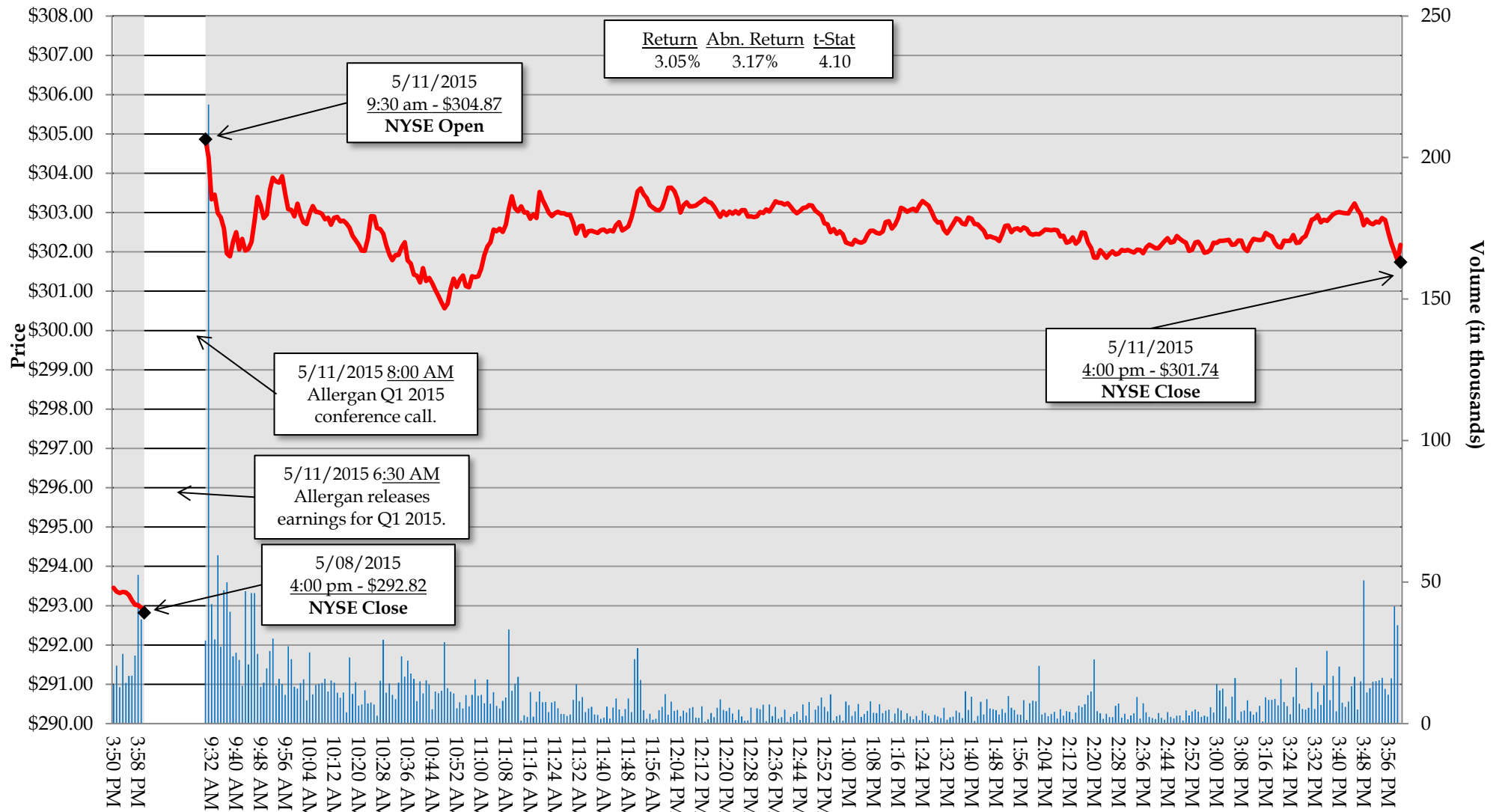
Source: TICK Data.

**Exhibit 8H**  
**Allergan Common Stock Intraday Price and Volume**  
**2/18/2015**



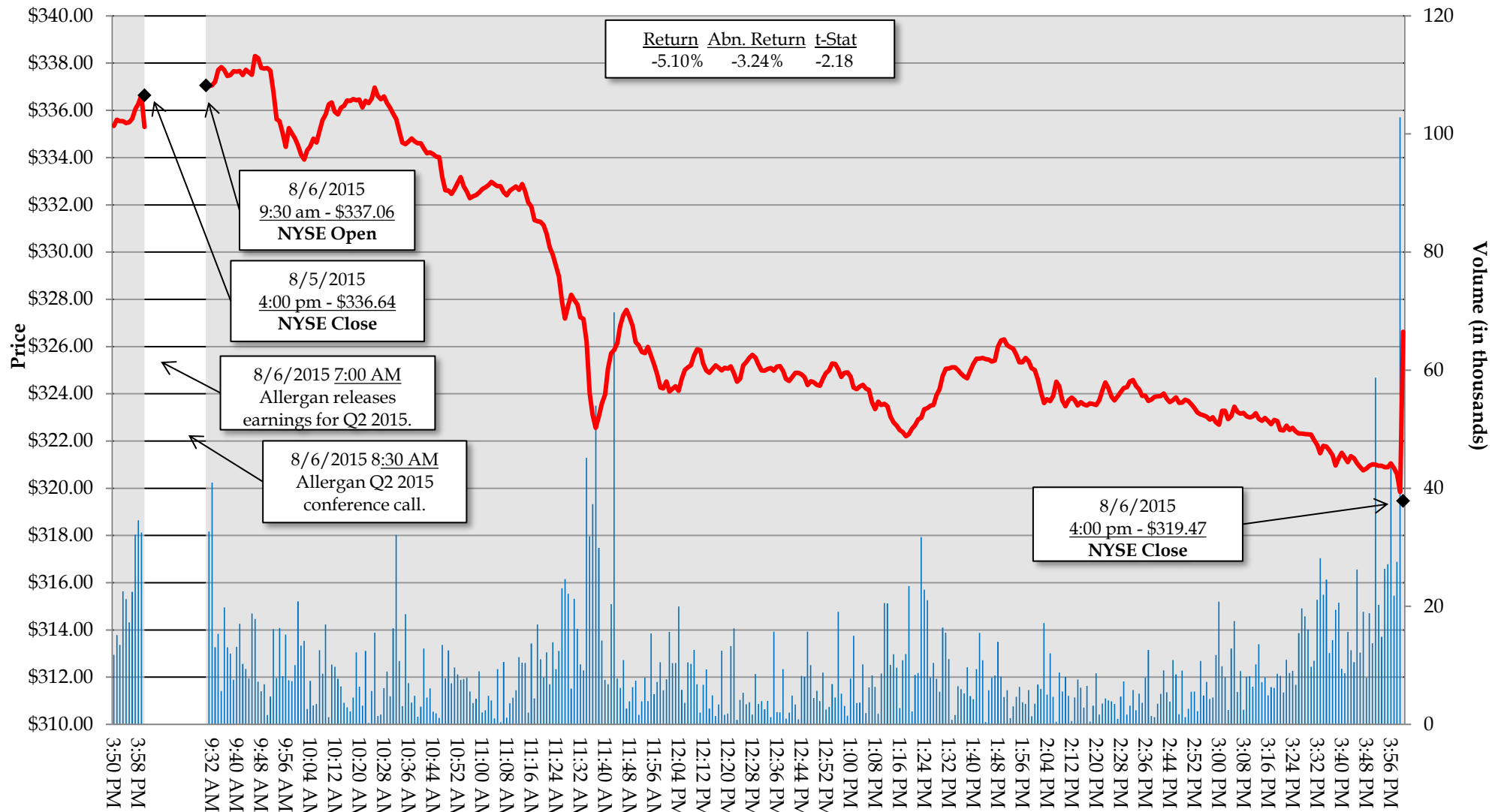
Source: TICK Data.

**Exhibit 8I**  
**Allergan Common Stock Intraday Price and Volume**  
**5/11/2015**



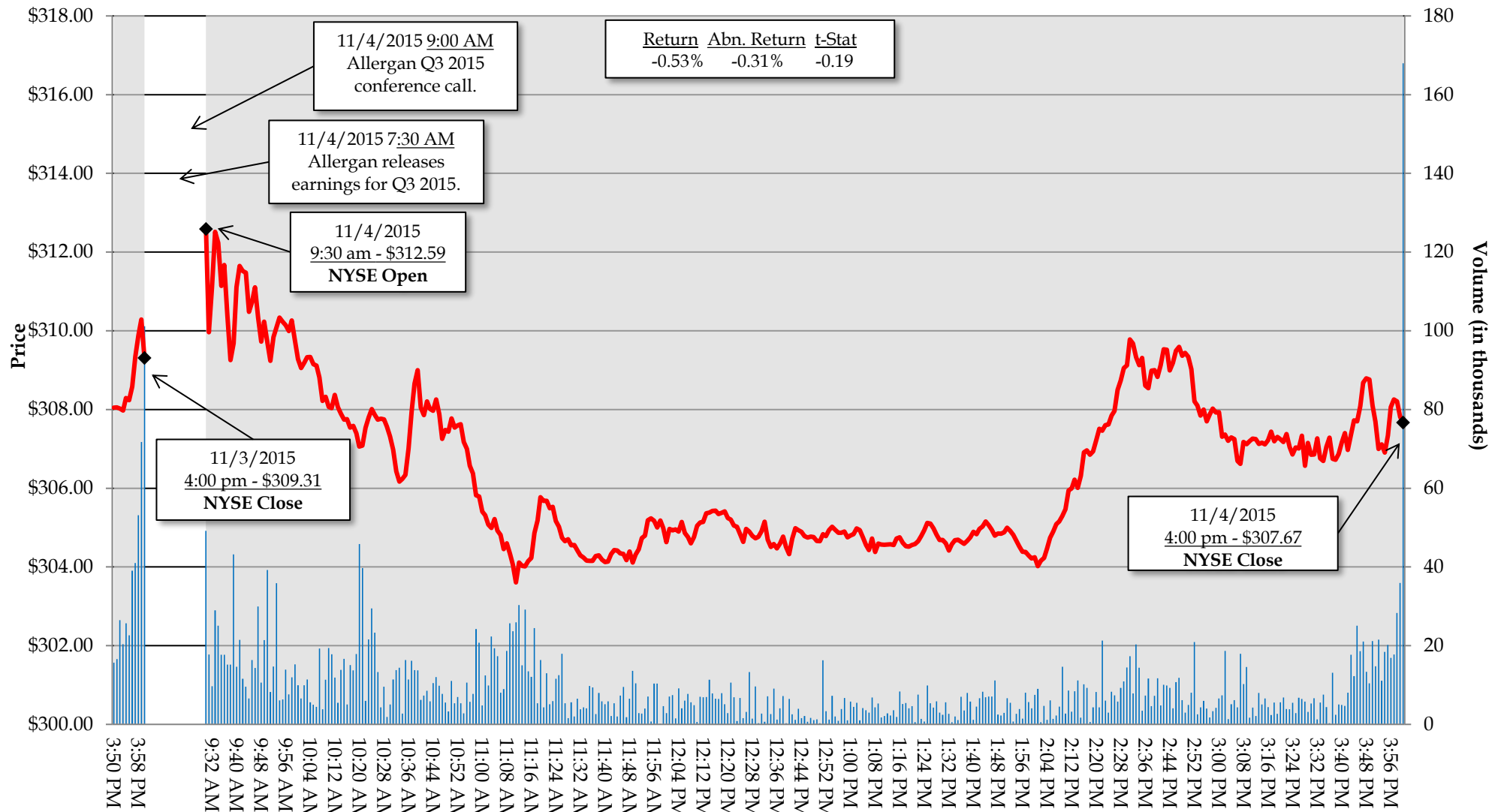
Source: TICK Data.

**Exhibit 8J**  
**Allergan Common Stock Intraday Price and Volume**  
**8/6/2015**



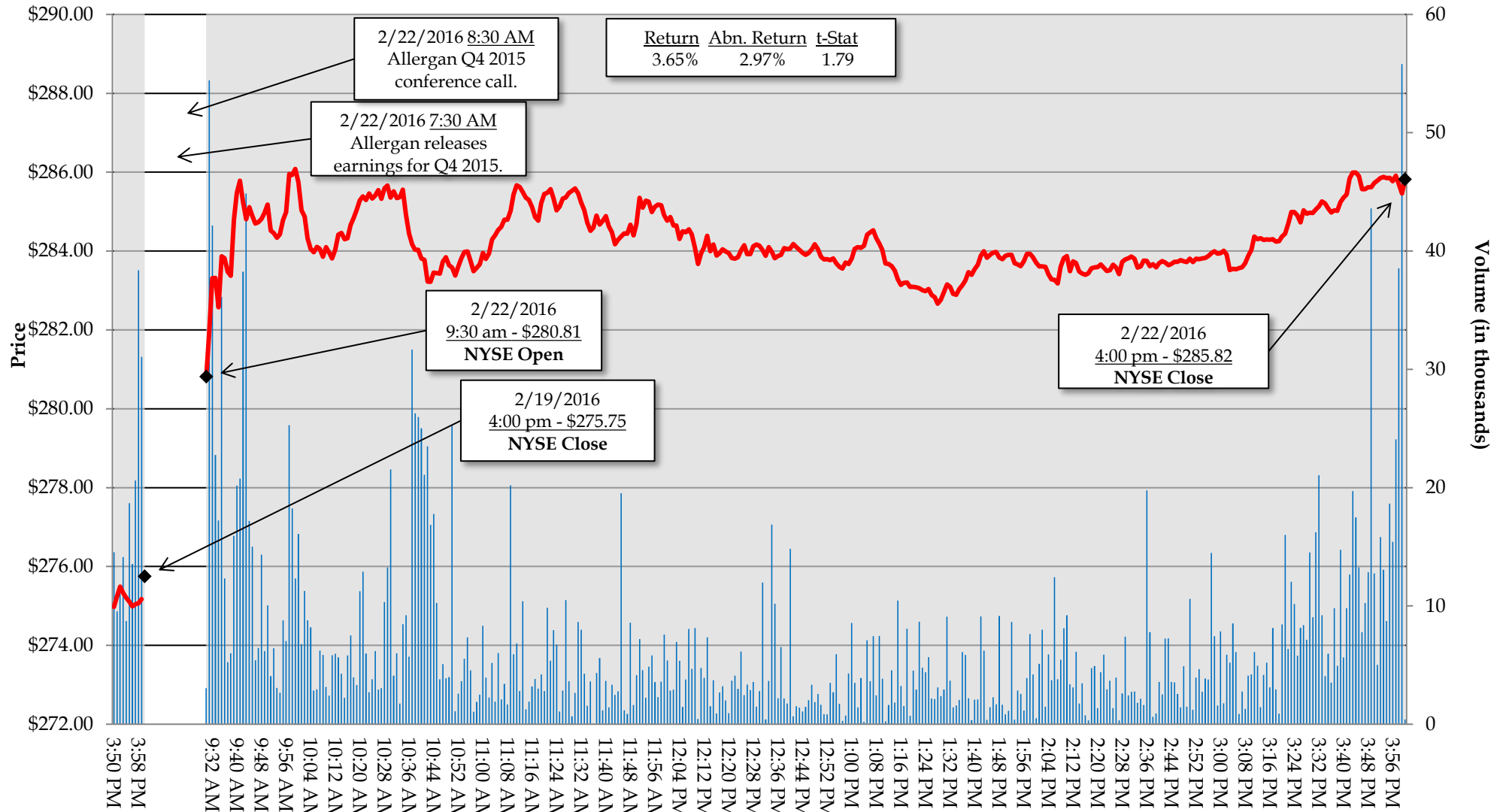
Source: TICK Data.

**Exhibit 8K**  
**Allergan Common Stock Intraday Price and Volume**  
**11/4/2015**



Source: TICK Data.

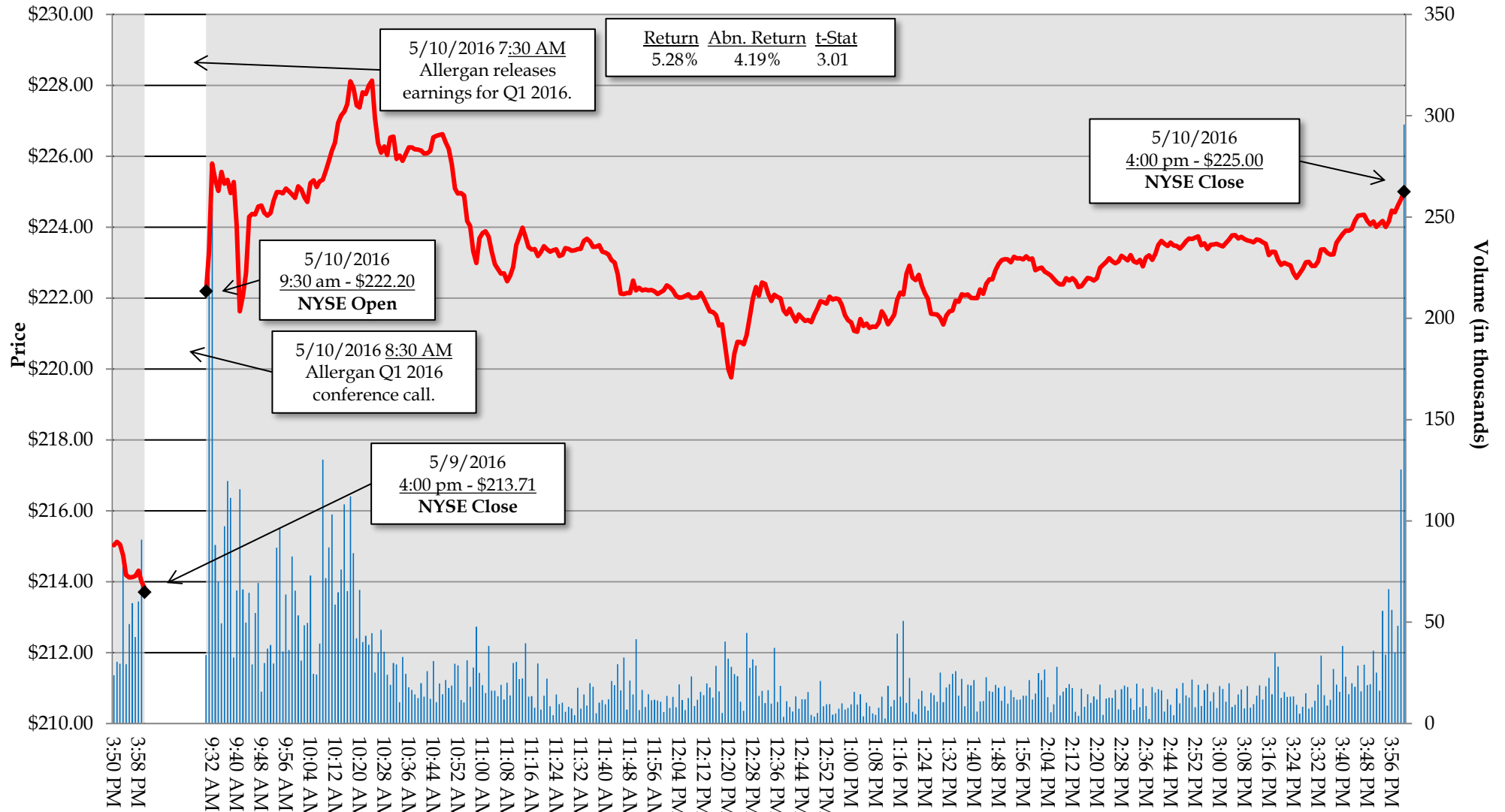
**Exhibit 8L**  
**Allergan Common Stock Intraday Price and Volume**  
**2/22/2016**



Source: TICK Data.

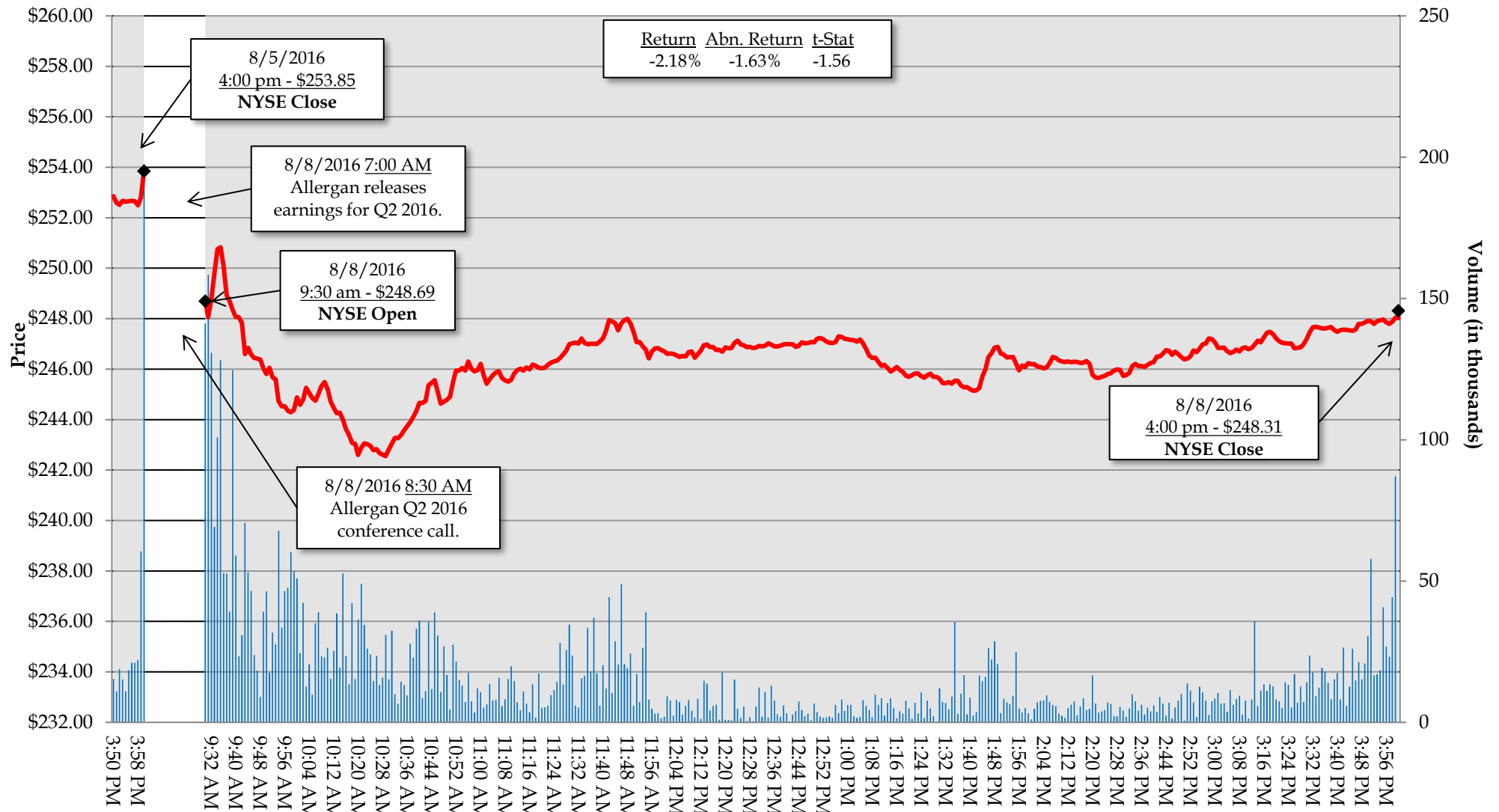


**Exhibit 8M**  
**Allergan Common Stock Intraday Price and Volume**  
**5/10/2016**



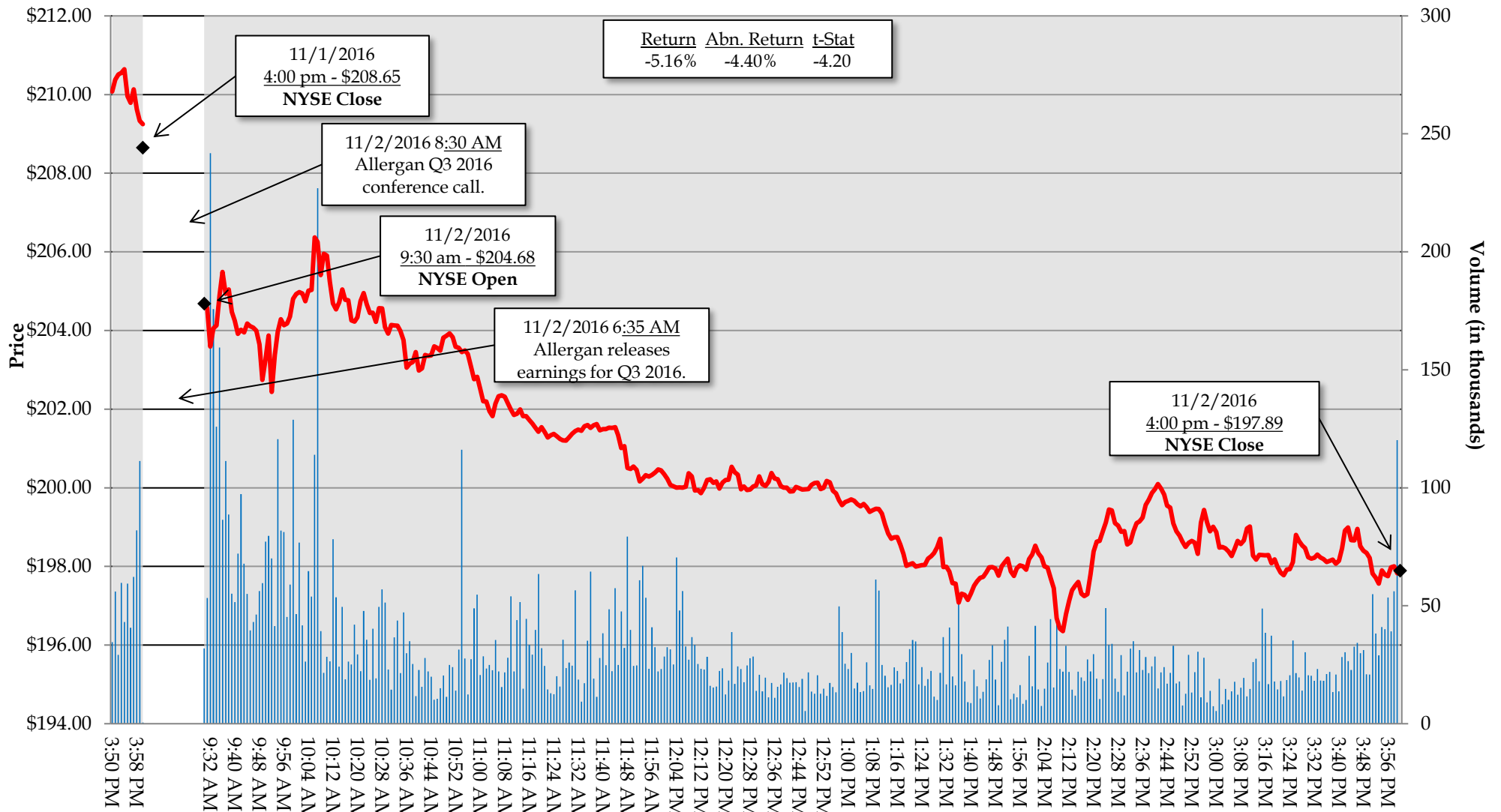
Source: TICK Data.

**Exhibit 8N**  
**Allergan Common Stock Intraday Price and Volume**  
**8/8/2016**



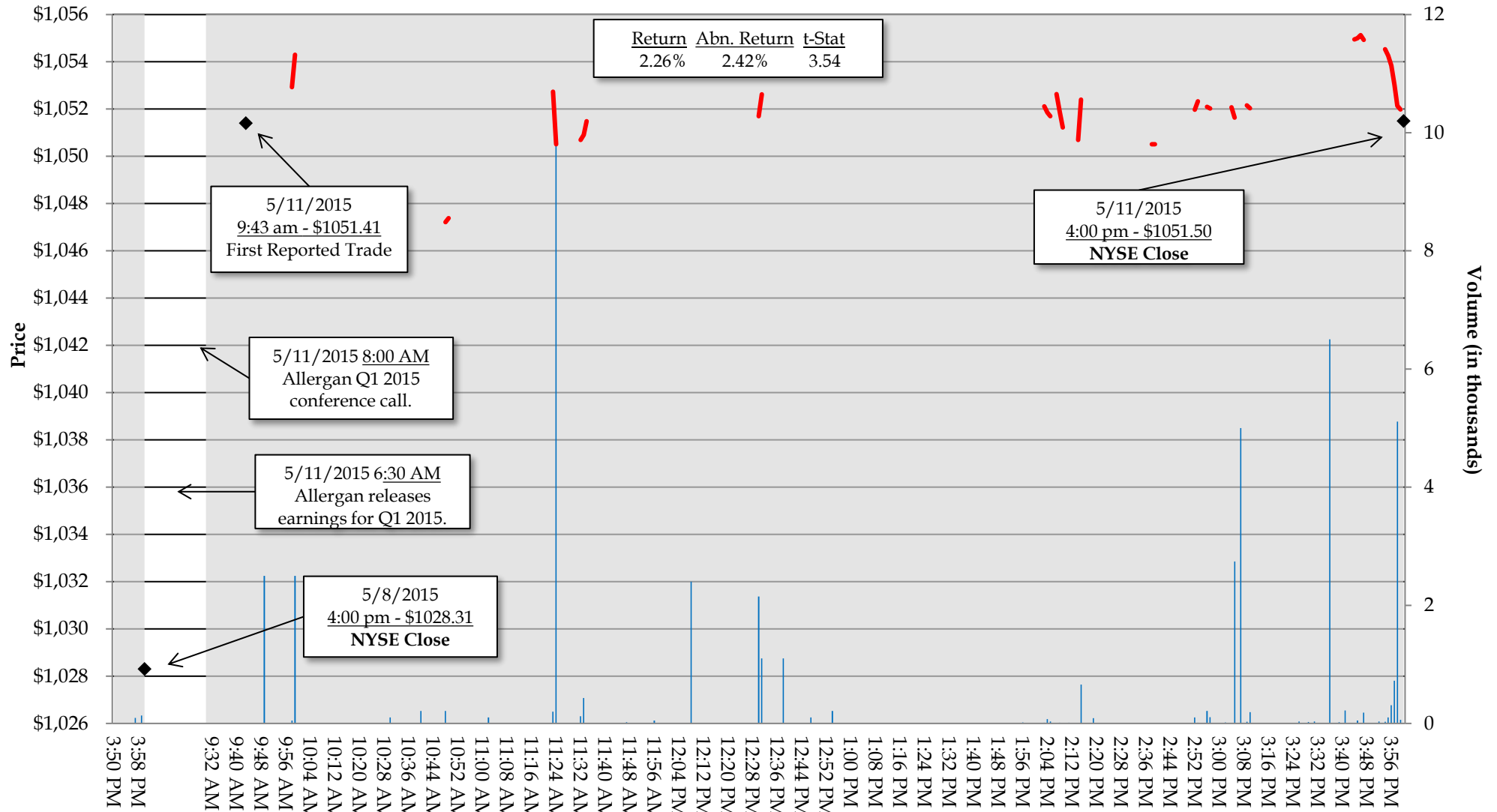
Source: TICK Data.

**Exhibit 8O**  
**Allergan Common Stock Intraday Price and Volume**  
**11/2/2016**



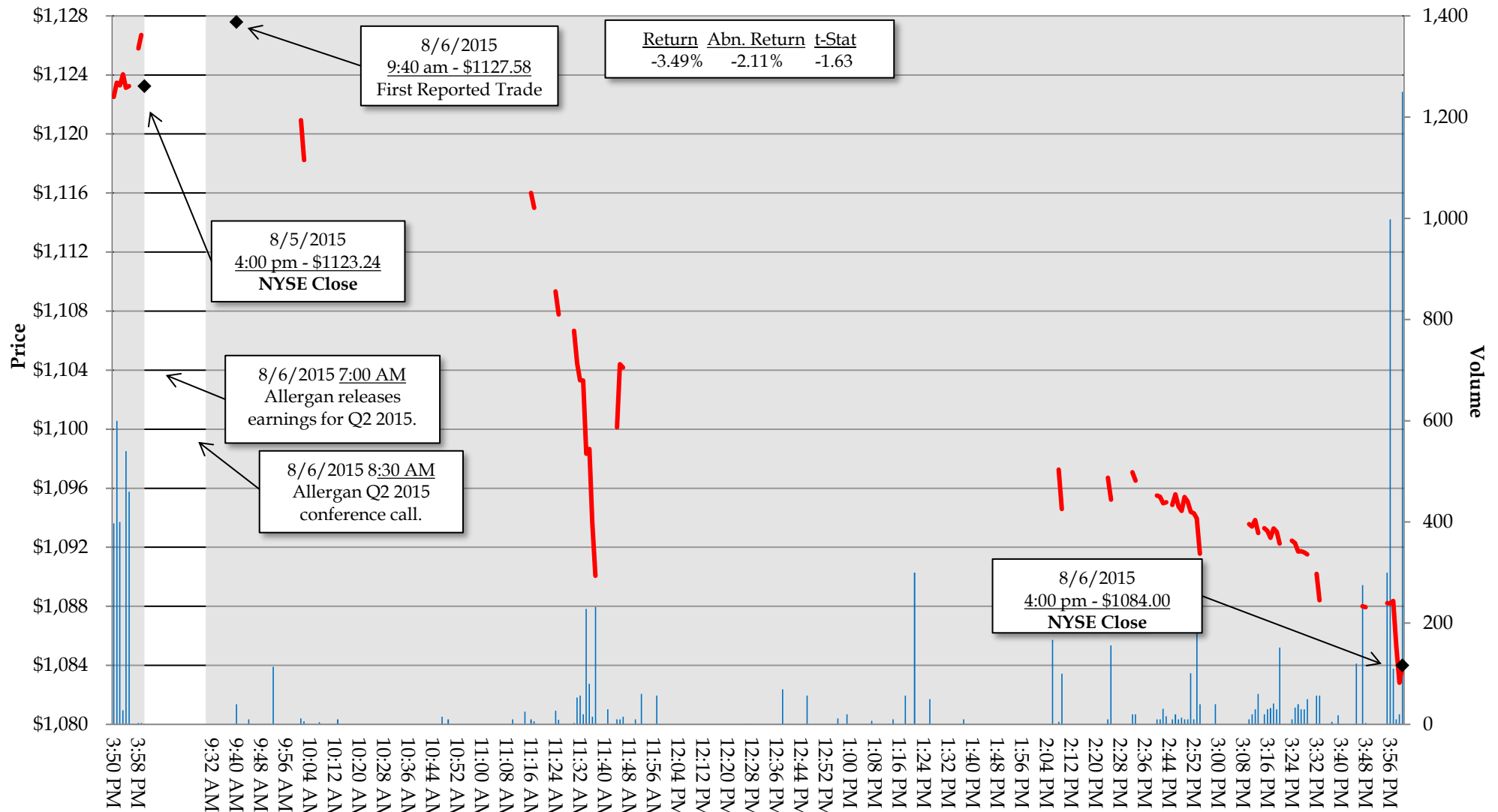
Source: TICK Data.

**Exhibit 8-PA**  
**Allergan Preferred Stock Intraday Price and Volume**  
**5/11/2015**



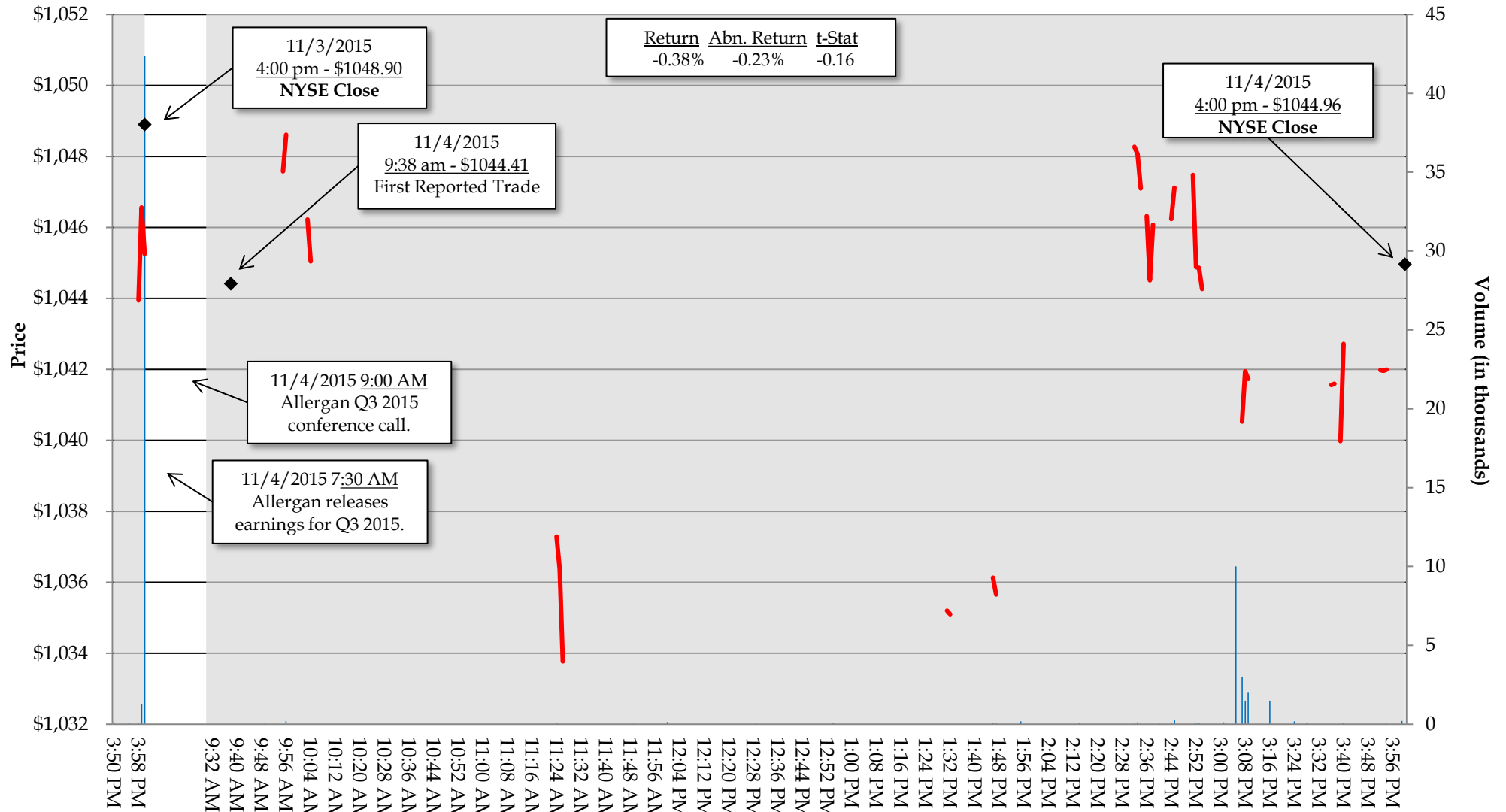
Source: TICK Data.

**Exhibit 8-PB**  
**Allergan Preferred Stock Intraday Price and Volume**  
**8/6/2015**



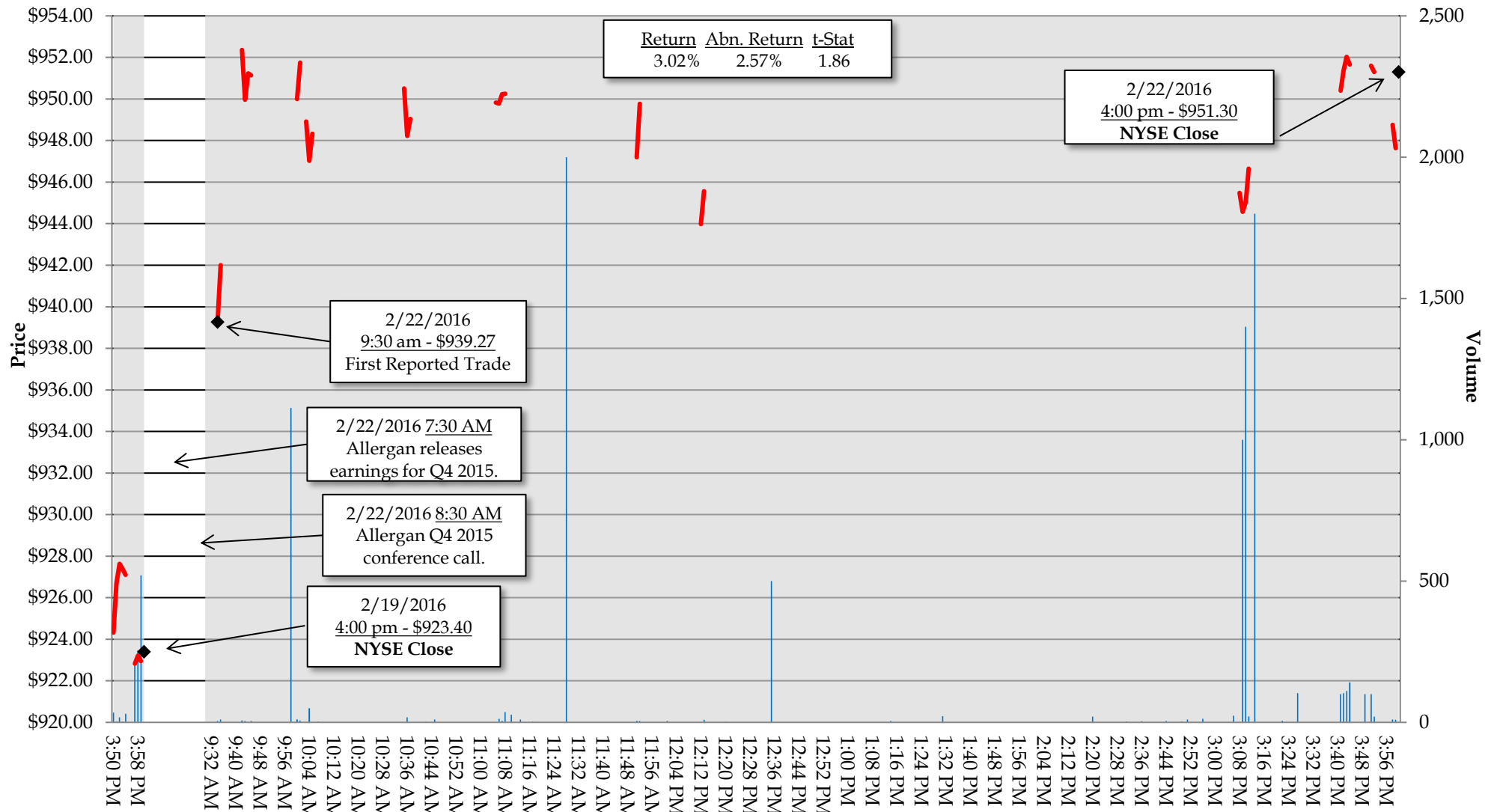
Source: TICK Data.

**Exhibit 8-PC**  
**Allergan Preferred Stock Intraday Price and Volume**  
**11/4/2015**



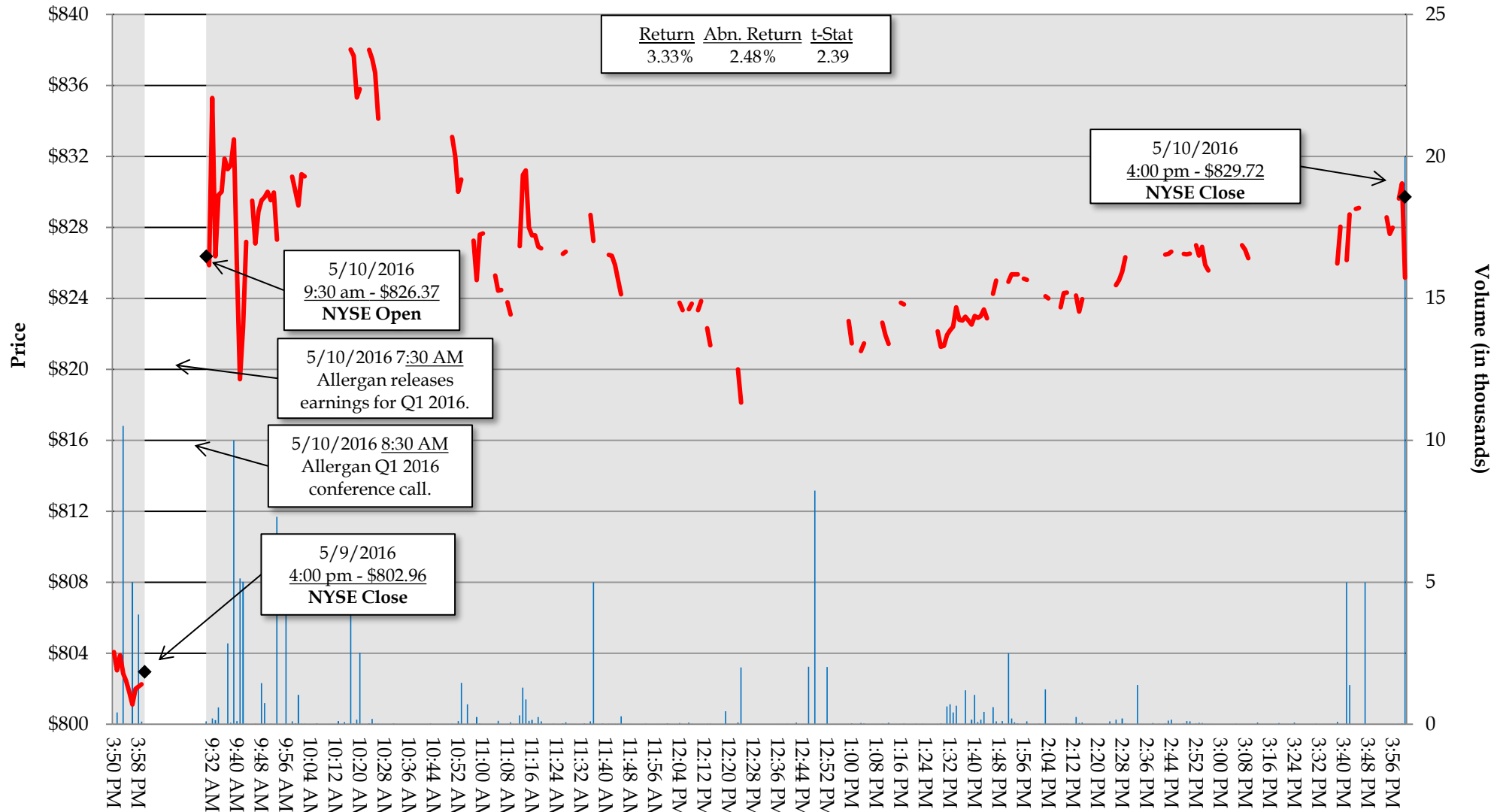
Source: TICK Data.

**Exhibit 8-PD**  
**Allergan Preferred Stock Intraday Price and Volume**  
**2/22/2016**



Source: TICK Data.

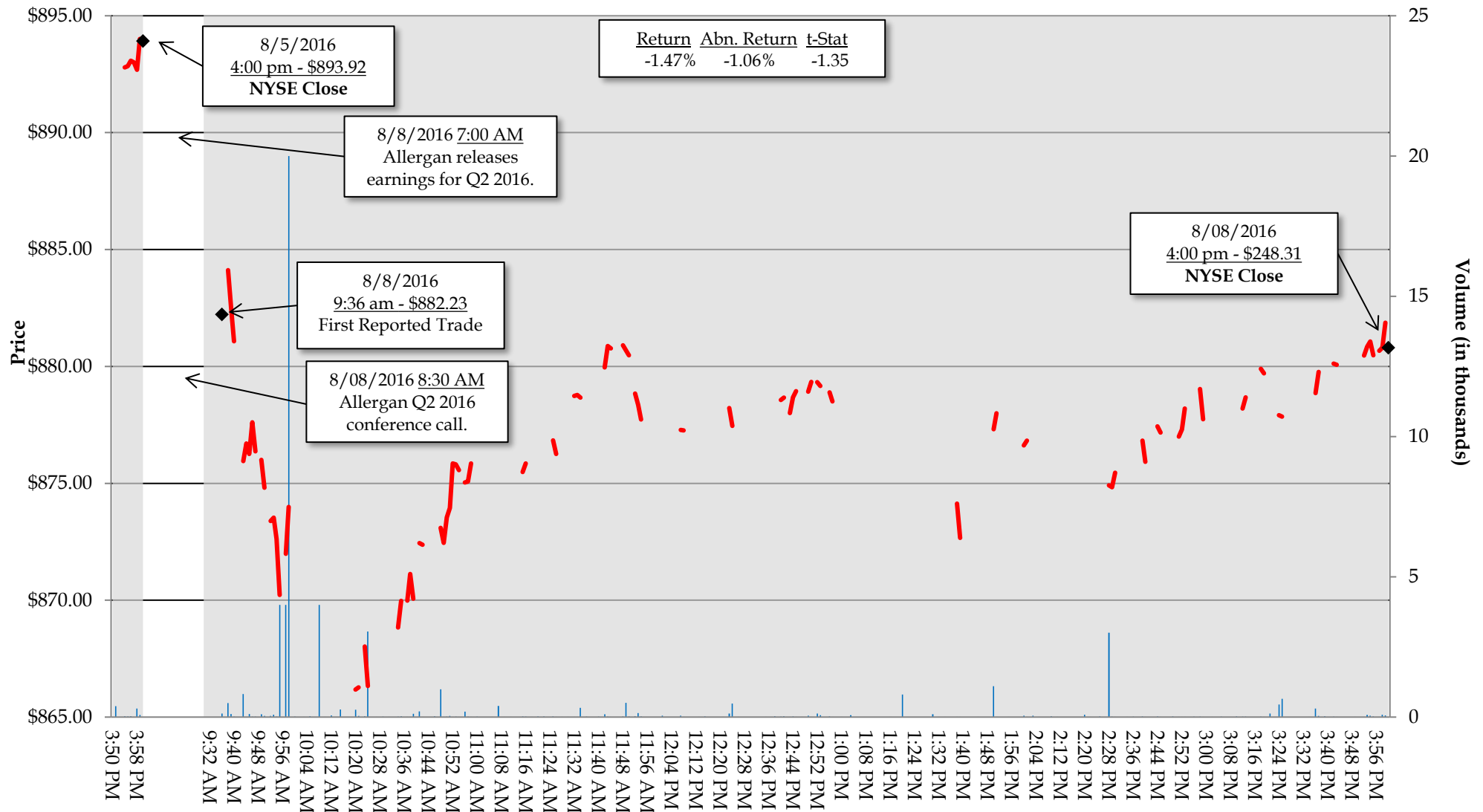
**Exhibit 8-PE**  
**Allergan Preferred Stock Intraday Price and Volume**  
**5/10/2016**



Source: TICK Data.

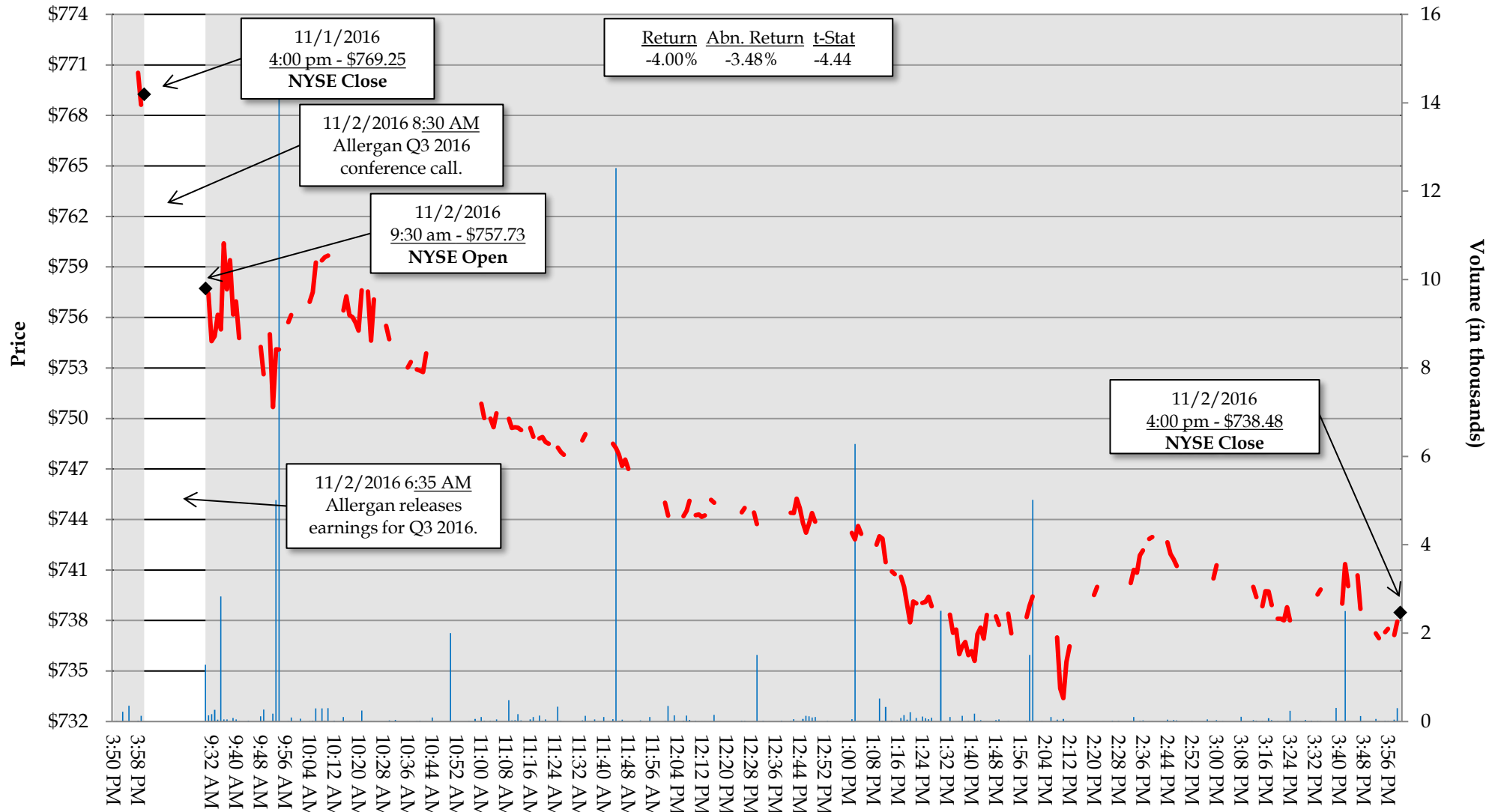


**Exhibit 8-PF**  
**Allergan Preferred Stock Intraday Price and Volume**  
**8/8/2016**



Source: TICK Data.

**Exhibit 8-PG**  
**Allergan Preferred Stock Intraday Price and Volume**  
**11/2/2016**



Source: TICK Data.

**Exhibit 9**  
**Comparison of Statistical Significance and Abnormal Returns**  
**for Allergan Common Stock Earnings Announcements**  
**vs. Days with No News during the Class Period**

Statistic	Earnings Announcements	Days with No News, Analyst Reports, or SEC Filings
N <sup>(1)</sup>	15	56
Significant Days at 95% Confidence Level	7	0
% Significant Days at 95% Confidence Level <sup>(2)</sup>	46.67%	0.00%
Average Absolute Abnormal Return <sup>(3)</sup>	2.39%	0.72%
Average Volume (Millions) <sup>(4)</sup>	5.2	1.9

Notes:

(1) Days with no news were days that had 3 or fewer news articles via the Factiva database, and no analyst reports, earnings announcements, and SEC filings were issued. Analyst reports covering and SEC filings issued by Forest Laboratories, Allergan, Inc., and Pfizer while under merger consideration with Allergan are also included in the analyst reports and SEC filings counts. There were 14 days with at most three news articles which, based on a review of the articles, I could not dismiss the news as immaterial. These included: November 12, 2013, November 21, 2013, May 28, 2014, July 25, 2014, September 2, 2014, October 16, 2014, March 19, 2015, June 2, 2015, July 14, 2015, July 15, 2015, September 2, 2015, September 11, 2015, June 3, 2016, and August 17, 2016.

(2) 46.67% rate of statistical significance is statistically significantly different than 0.00% at the 99% confidence level.

(3) 2.39% absolute return is statistically significantly different than 0.72% based on a t-test for difference of means at the 99% confidence level.

(4) The difference between 5.2 million and 1.9 million is statistically significant at the 99% confidence level.

**Exhibit 9-P**  
**Comparison of Statistical Significance and Abnormal Returns**  
**for Allergan Preferred Stock Earnings Announcements**  
**vs. Days with No News during the Analysis Period**

Statistic	Earnings Announcements	Days with No News, Analyst Reports, or SEC Filings
N <sup>(1)</sup>	7	15
Significant Days at 95% Confidence Level	3	1
% Significant Days at 95% Confidence Level <sup>(2)</sup>	42.86%	6.67%
Average Absolute Abnormal Return <sup>(3)</sup>	2.05%	0.80%
Average Volume (Thousands) <sup>(4)</sup>	73.1	17.0

Notes:

(1) Days with no news were days that had 3 or fewer news articles via the Factiva database, and no analyst reports, earnings announcements, and SEC filings were issued. Analyst reports covering and SEC filings issued by Allergan, Inc. and Pfizer while under merger consideration with Allergan are also included in the analyst reports and SEC filings counts. There were 8 days with at most three news articles which, based on a review of the articles, I could not dismiss the news as immaterial. These included: March 19, 2015, June 2, 2015, July 14, 2015, July 15, 2015, September 2, 2015, September 11, 2015, June 3, 2016, and August 17, 2016.

(2) 42.86% rate of statistical significance is statistically significantly different than 6.67% at the 90% confidence level.

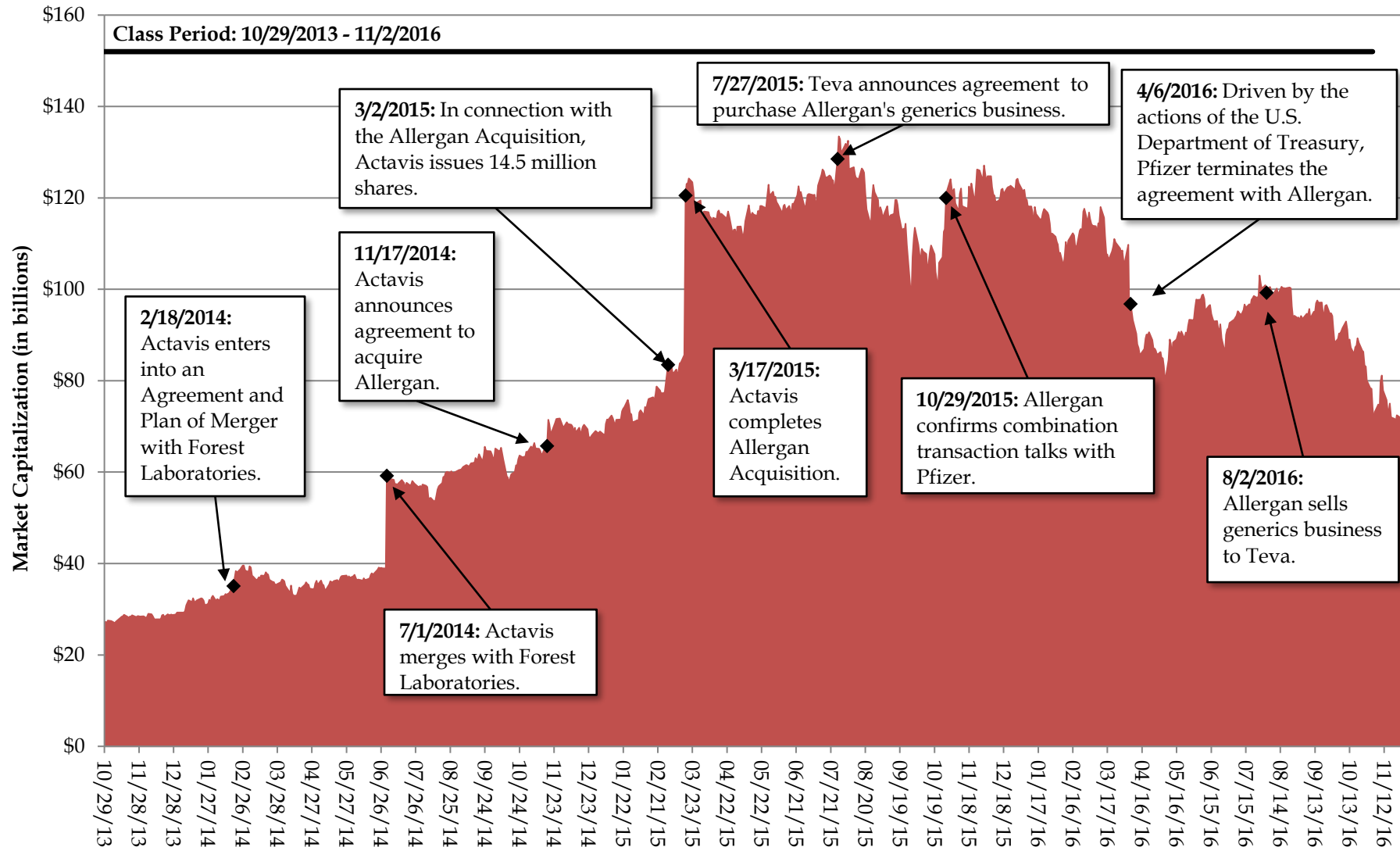
(3) 2.05% absolute return is statistically significantly different than 0.80% based on a t-test for difference of means at the 99% confidence level.

(4) The difference between 73.1 thousand and 17.0 thousand is statistically significant at the 99% confidence level.

# Exhibit 10

## Allergan Common Stock Market Capitalization

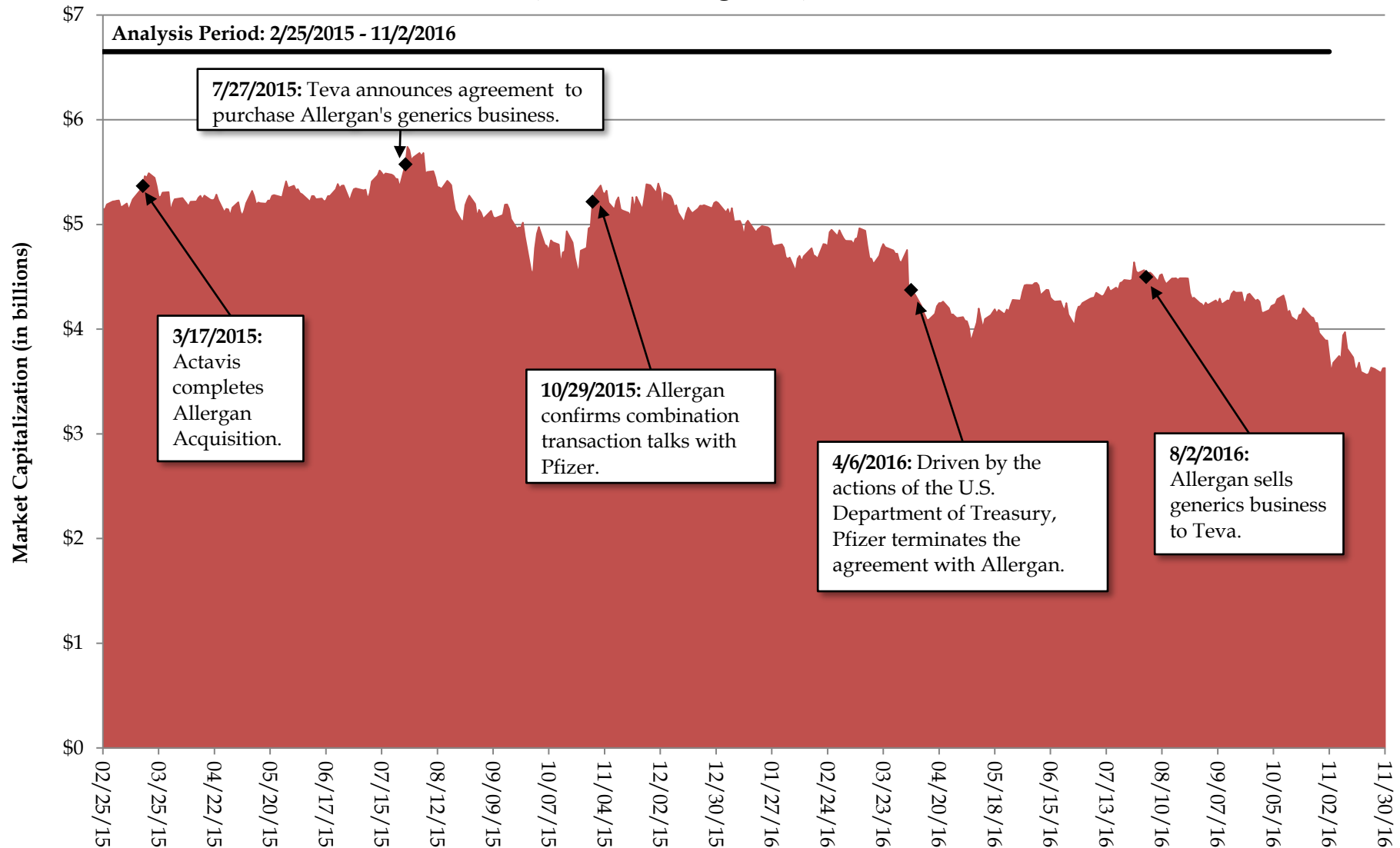
### 10/29/2013 - 11/30/2016



Sources: Complaint, Allergan SEC Filings, S&P Capital IQ.

Note: Market Capitalization multiplies the price from S&P Capital IQ by common shares outstanding recorded from Allergan SEC Filings.

# **Exhibit 10-P** **Allergan Preferred Stock Market Capitalization** **2/25/2015 (Initial Trading Date) - 11/30/2016**



Sources: Complaint, Allergan SEC Filings, S&P Capital IQ.

Note: Market Capitalization multiplies the price from S&P Capital IQ by preferred shares outstanding recorded from Allergan SEC Filings.

**Exhibit 11**  
**Allergan Common Stock**  
**Market Capitalization Rankings**

<b>Last trading day of:</b>	<b>Market Capitalization (billions)</b>	<b>Percentile Rank on NYSE &amp; NASDAQ</b>
Q4 2013	\$29.27	96 %
Q1 2014	\$35.90	97 %
Q2 2014	\$38.92	97 %
Q3 2014	\$63.92	99 %
Q4 2014	\$68.45	99 %
Q1 2015	\$116.76	99 %
Q2 2015	\$119.29	99 %
Q3 2015	\$107.09	99 %
Q4 2015	\$123.28	99 %
Q1 2016	\$105.98	99 %
Q2 2016	\$91.47	99 %
Q3 2016	\$88.25	99 %
Q4 2016	\$78.77	99 %

Source: Bloomberg, S&P Capital IQ, and Allergan SEC Filings.

Note:

1. Market Capitalization multiplies the price from S&P Capital IQ by common shares outstanding recorded from Allergan SEC Filings.

**Exhibit 11-P**  
**Allergan Preferred Stock**  
**Market Capitalization Rankings**

<b>Last trading day of:</b>	<b>Market Capitalization (billions)</b>	<b>Percentile Rank on NYSE &amp; NASDAQ</b>
Q1 2015	\$5.12	82%
Q2 2015	\$5.29	82%
Q3 2015	\$4.77	83%
Q4 2015	\$5.21	83%
Q1 2016	\$4.65	82%
Q2 2016	\$4.22	81%
Q3 2016	\$4.16	80%
Q4 2016	\$3.86	78%

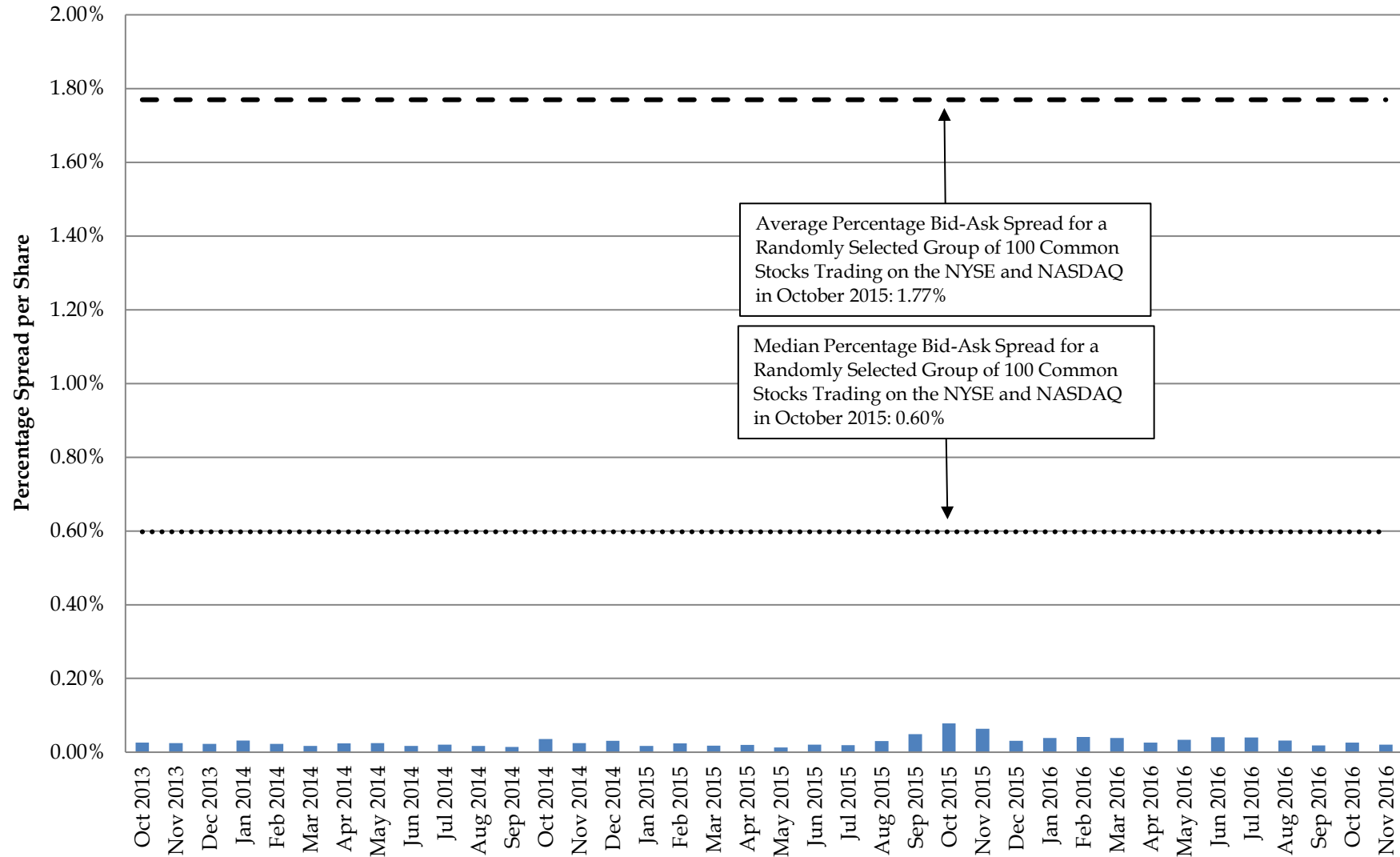
Source: Bloomberg, S&P Capital IQ, and Allergan SEC Filings.

Notes:

1. Market Capitalization multiplies the price from S&P Capital IQ by preferred shares outstanding recorded from Allergan SEC Filings.
2. On 2/24/2015, Allergan issued 5,060,000 shares of preferred stock.



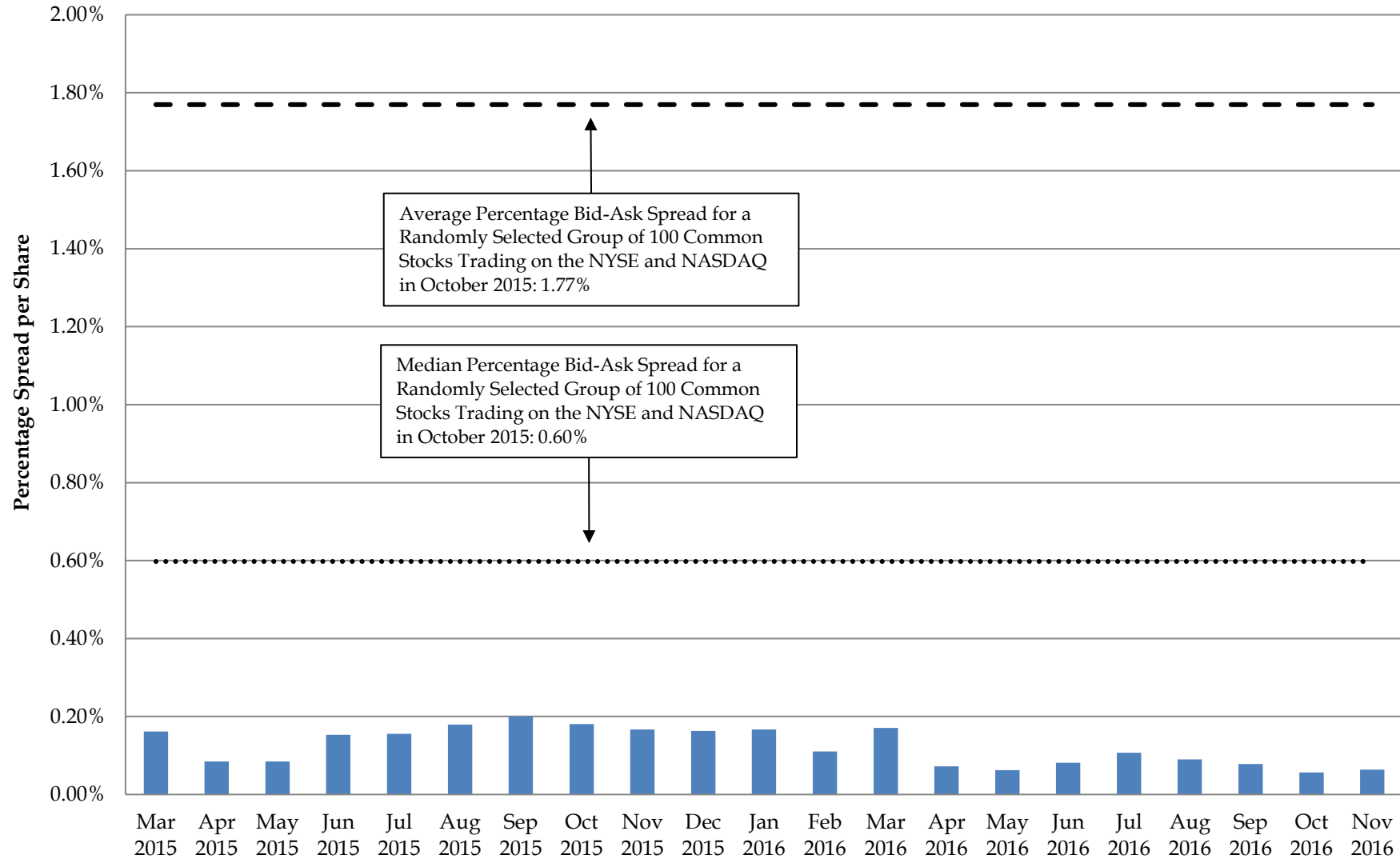
**Exhibit 12**  
**Allergan Common Stock Average Monthly Bid-Ask Percentage Spread**  
**10/29/2013 - 11/2/2016**



Source: Thomson Reuters Eikon and Tick Data.

Note: October 2013 and November 2016 data are limited to the Class Period.

**Exhibit 12-P**  
**Allergan Preferred Stock Average Monthly Bid-Ask Percentage Spread**  
**3/5/2015 - 11/2/2016**



Source: Thomson Reuters Eikon and Tick Data.

Note: Earliest Allergan Preferred Stock Tick data is available March 5, 2015. November 2016 data is limited to the Analysis Period.

**Exhibit 13**  
**Allergan Common Stock Shares Outstanding, Insider Holdings, and Institutional Holdings**

Date	Shares Outstanding (in 000s)	Total Institutions Owning Stock	Insider Holdings (in 000s)	Short Interest (in 000s)	Public Float (in 000s)	Insider Holdings % of Shares Outstanding	Total Institutional Holdings (in 000s)	Institutional Holdings % of Shares Outstanding	Institutional Holdings % of Public Float
[1]	[2]	[3]	[4]	[5]	[6] = [2] + [5] - [4]	[7] = [4] / [2]	[8]	[9] = [8] / [2]	[10] = [8] / [6]
12/31/2013	174,200	757	842	1,828	175,186	0.48%	151,918	87%	87%
3/31/2014	174,400	858	828	9,868	183,441	0.47%	165,362	95%	90%
6/30/2014	174,500	918	838	19,100	192,762	0.48%	180,890	104%	94%
9/30/2014	264,900	1,009	832	1,759	265,827	0.31%	238,713	90%	90%
12/31/2014	265,900	1,117	895	14,410	279,416	0.34%	258,862	97%	93%
3/31/2015	392,300	1,388	935	26,274	417,639	0.24%	360,796	92%	86%
6/30/2015	393,100	1,393	692	4,910	397,318	0.18%	353,110	90%	89%
9/30/2015	394,000	1,427	812	6,091	399,279	0.21%	363,340	92%	91%
12/31/2015	394,500	1,508	904	4,571	398,167	0.23%	372,794	94%	94%
3/31/2016	395,400	1,509	703	5,779	400,475	0.18%	366,083	93%	91%
6/30/2016	395,800	1,496	764	7,227	402,263	0.19%	360,238	91%	90%
9/30/2016	383,200	1,491	754	8,261	390,707	0.20%	351,217	92%	90%
12/31/2016	375,080	1,477	754	25,270	399,596	0.20%	342,110	91%	86%
<b>Total Institutions over Class Period:</b>		<b>2,408</b>				<b>Class Period Average:</b>	<b>0.29%</b>	<b>92.93%</b>	<b>89.96%</b>

Sources: S&P Capital IQ and SEC filings.

(1) S&P Capital IQ updates short interest every two weeks while updates to institutional holdings via 13-F filings are only available every quarter; therefore, occasionally the time difference in data updates may cause institutional holdings to appear to exceed shares outstanding.

**Exhibit 14**  
**Allergan Common Stock**  
**Test for Autocorrelation During the Class Period**

<b>Periods</b>	<b>Coefficient on Previous Day's Abnormal Return</b>	<b>t-Statistic</b>	<b>Significance Level <sup>(3)</sup></b>
10/29/2013 - 2/17/2014	0.09	0.91	
2/18/2014 - 6/30/2014	0.10	0.93	
7/1/2014 - 11/16/2014	-0.02	-0.19	
11/17/2014 - 3/16/2015	0.08	0.69	
3/17/2015 - 7/26/2015	0.12	1.12	
7/27/2015 - 10/28/2015	0.04	0.35	
10/29/2015 - 4/5/2016 <sup>(2)</sup>	-0.29	-2.41	**
4/6/2016 - 8/1/2016	0.03	0.22	
8/2/2016 - 11/2/2016	0.04	0.32	
<b>Class Period</b>	<b>-0.03</b>	<b>-0.80</b>	

Source: S&P Capital IQ.

Notes:

(1) For each period, I perform a regression with the abnormal return from the event study as the dependent variable and the previous day's abnormal return as the independent variable.

(2) The significant results are heavily influenced by a few dates. Specifically, the movements on five dates (11/18/2015, 11/19/2015, 11/20/2015, 11/23/2015, and 4/5/2016) are explained by news and are not due to an underlying existence of autocorrelation. The removal of these dates eliminates the significant autocorrelation over this estimation window.

(3) "\*\*\*\*" Denotes statistical significance at the 99% confidence level or greater. "\*\*\*" Denotes statistical significance at the 95% confidence level or greater. "\*\*" Denotes statistical significance at the 90% confidence level or greater.

**Exhibit 14-P**  
**Allergan Preferred Stock**  
**Test for Autocorrelation During the Analysis Period**

<b>Periods</b>	<b>Coefficient on Previous Day's Abnormal Return</b>	<b>t-Statistic</b>	<b>Significance Level <sup>(3)</sup></b>
2/25/2015 - 3/16/2015	-0.44	-1.60	
3/17/2015 - 7/26/2015	-0.01	-0.12	
7/27/2015 - 10/28/2015	-0.12	-1.05	
10/29/2015 - 4/5/2016 <sup>(2)</sup>	-0.25	-2.22	**
4/6/2016 - 8/1/2016	-0.05	-0.45	
8/2/2016 - 11/2/2016	0.06	0.43	
<b>Analysis Period <sup>(2)</sup></b>	<b>-0.14</b>	<b>-2.87</b>	<b>***</b>

Source: S&P Capital IQ.

Notes:

(1) For each period, I perform a regression with the abnormal return from the event study as the dependent variable and the previous day's abnormal return as the independent variable.

(2) The significant results are heavily influenced by a few dates. Specifically, the movements on five dates (11/18/2015, 11/19/2015, 11/20/2015, 11/23/2015, and 4/5/2016) are explained by news and are not due to an underlying existence of autocorrelation. The removal of these dates eliminates the significant autocorrelation over this estimation window and the Analysis Period.

(3) "\*\*\*\*" Denotes statistical significance at the 99% confidence level or greater. "\*\*\*" Denotes statistical significance at the 95% confidence level or greater. "\*\*" Denotes statistical significance at the 90% confidence level or greater.

### Exhibit 15 Allergan Preferred Stock Movements on Select Dates

Date	Day	Price	Volume (Thousands)	Raw Return	Event Study Results <sup>(1)</sup>			Sig Level	News
					Abnormal Return	t-Stat			
11/18/15	Wed	\$1,039.29	19.1	3.57%	2.58%	1.86	*		<ul style="list-style-type: none"> <li>"Merck KGaA, Darmstadt, Germany, and Pfizer today announced that the US Food and Drug Administration (FDA) has granted avelumab*, an investigational fully human anti-PD-L1 IgG1 monoclonal antibody, Breakthrough Therapy designation for the treatment of patients with metastatic Merkel cell carcinoma (MCC) who have progressed after at least one previous chemotherapy regimen." ("Merck KGaA, Darmstadt, Germany, And Pfizer Receive FDA Breakthrough Therapy Designation For Avelumab In Metastatic Merkel Cell Carcinoma &gt;PFE," <i>Dow Jones Institutional News</i>, November 18, 2018, 7:00 AM EST)</li> <li>"Pfizer Inc. announced today that PROFILE 1029, a Phase 3 study of anaplastic lymphoma kinase (ALK) inhibitor XALKORI(R) (crizotinib), met its primary objective of significantly prolonging progression-free survival (PFS) in previously untreated East Asian patients with ALK-positive advanced non-small cell lung cancer (NSCLC) when compared to a standard chemotherapy doublet." ("Pfizer Reports Positive Topline Results from Phase 3 Trial Comparing XALKORI(R) (crizotinib) to Chemotherapy in Previously Untreated East Asian Patients with ALK-Positive Advanced Non-Small Cell Lung Cancer (NSCLC)," <i>Business Wire</i>, November 18, 2018 8:00 AM EST)</li> </ul>
11/19/15	Thu	\$1,017.29	87.9	-2.12%	-1.93%	-1.40			<ul style="list-style-type: none"> <li>"Allergan (AGN) shares take a tumble after reports surfaced that the Treasury Department is releasing new "targeted guidance" this week to reduce the benefits of tax inversions. AGN and Pfizer (PFE) have been in talks about combining in what would be structured as a tax inversion, WSJ has reported." ("Allergan Shares Tumble on News of Anti-Inversion Rules -- Market Talk," <i>Dow Jones Institutional News</i>, November 18, 2018 4:58 PM EST)</li> </ul>
11/20/15	Fri	\$1,040.18	65.2	2.25%	1.87%	1.35			<ul style="list-style-type: none"> <li>"Pfizer Inc and Allergan Inc chief executives have agreed on the roles they would assume in a combined company, removing one of the last hurdles to the largest ever healthcare merger, people familiar with the matter said." ("EXCLUSIVE-Pfizer, Allergan CEOs agree on combined company roles -sources," <i>Reuters News</i>, November 20, 2015 1:38 PM EST)</li> <li>"The lack of material action by the Treasury increases the probability of the announcement of a definitive Pfizer-Allergan merger over the very near term, in our view." ("Pfizer &amp; Allergan are Going to Merge and There's Nothing the IRS Can Do -- Barron's Blog," <i>Dow Jones Institutional News</i>, November 20, 2015, 3:28 PM EST)</li> </ul>
11/23/15	Mon	\$1,016.38	52.0	-2.29%	-2.56%	-1.84	*		<ul style="list-style-type: none"> <li>Pfizer and Allergan released details to their merger, which would make the largest pharmaceutical company in the world. Hundreds of news articles cover the merger, discussing the tax inversion element of the merger and the US government's reaction.</li> </ul>
4/5/16	Tue	\$ 839.37	702.2	-10.71%	-10.21%	-7.37	***		<ul style="list-style-type: none"> <li>"New Treasury rules announced today aimed at discouraging "inversions"--mergers that move US companies overseas for tax purposes--may complicate Pfizer's (PFE) takeover of Allergan (AGN)." ("New Inversion Rules Could Snag Pfizer/Allergan -- Market Talk," <i>Dow Jones Institutional News</i>, April 4, 2016, 5:31 PM EST)</li> </ul>

Sources: S&P Capital IQ and Factiva.

Notes:

(1) The results are based upon 6 fixed regressions over the Analysis Period. The regressions control for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is comprised of the companies that were members of the Dow Jones US Pharmaceutical Index during the Analysis Period. Companies while under merger consideration with Allergan are removed from the Peer Index. I employed 6 discrete estimation windows to address the fact that the return generating process of Allergan Preferred Stock was impacted by the various merger, acquisition, and divestiture announcements, which I refer to as Corporate Action Events, during the Analysis Period. The 6 different estimation windows are outlined in Section F.2 of my report. Earnings, pre-announcements, the alleged corrective disclosure on 8/6/2015 (which is also an earnings date), and outlier dates have been removed from estimation. The outlier dates include 7/27/2015, Teva announces agreement to purchase Allergan's generics business and 4/5/2016, the U.S. moves to make tax inversions less financially appealing, putting the Pfizer-Allergan deal in doubt.

(2) "\*\*\*\*" Denotes statistical significance at the 99% confidence level or greater. "\*\*\*" Denotes statistical significance at the 95% confidence level or greater. "\*\*" Denotes statistical significance at the 90% confidence level or greater.

**Exhibit 16**  
**Allergan Preferred Stock**  
**Test for Autocorrelation After Excluding Events in Exhibit 15**

<b>Periods</b>	<b>Coefficient on Previous Day's Abnormal Return</b>	<b>t-Statistic</b>	<b>Significance Level <sup>(3)</sup></b>
2/25/2015 - 3/16/2015	-0.44	-1.60	
3/17/2015 - 7/26/2015	-0.01	-0.12	
7/27/2015 - 10/28/2015	-0.12	-1.05	
10/29/2015 - 4/5/2016	-0.03	-0.35	
4/6/2016 - 8/1/2016	-0.05	-0.45	
8/2/2016 - 11/2/2016	0.06	0.43	
<b>Analysis Period</b>	<b>-0.08</b>	<b>-1.57</b>	

Source: S&P Capital IQ.

Notes:

- (1) For each period, I perform a regression with the abnormal return from the event study as the dependent variable and the previous day's abnormal return as the independent variable.
- (2) The returns of five dates have been removed from the analysis. The movements on these five dates (11/18/2015, 11/19/2015, 11/20/2015, 11/23/2015, and 4/5/2016) are explained by news and are not due to an underlying existence of autocorrelation.
- (3) "\*\*\*\*" Denotes statistical significance at the 99% confidence level or greater. "\*\*\*" Denotes statistical significance at the 95% confidence level or greater. "\*\*" Denotes statistical significance at the 90% confidence level or greater.

## **Appendix A**

### **Documents Considered**

#### **Court Documents**

- Consolidated Second Amended Class Action Complaint, in *Re Allergan Generic Drug Pricing Securities Litigation*, No. 2:16-9449 (KSH) (CLW).

#### **Court Decisions and Securities Law**

- *Basic, Inc. v. Levinson*, 485 U.S. 224 (1988).
- Bromberg & Lowenfels, 4 *Securities Fraud and Commodities Fraud*, § 8.6. (Aug. 1988).
- *Cammer, et al., v. Bruce M. Bloom, et al.*, 711 F. Supp. 1264 (D.N.J. 1989).
- *Halliburton Co., et al., v. Erica P. John Fund, Inc.*, 134 S. Ct. 2398 (2014).
- *Heckmann Corp. Sec. Litig., No. 10–378–LPS–MPT*, 2013 WL 2456104v (June 2013).
- *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001).
- Private Securities Litigation Reform Act of 1995, dated December 22, 1995.

#### **SEC Filings**

- Actavis plc and Allergan plc Def 14-A Proxy Statements for the fiscal years in the Class Period.
- Actavis plc and Allergan plc SEC Form 10-K filings submitted throughout the Class Period.
- Actavis plc and Allergan plc SEC Form 10-Q filings submitted throughout the Class Period and for the Quarterly Period-End March 31, 2018.
- Actavis plc and Allergan plc SEC Form 8-K filings submitted during the Class Period.
- Actavis S-3 and Actavis S-3ASR filed on August 1, 2014 and February 19, 2014, respectively.
- Actavis plc SEC Form 424(b)(2) Supplement filed February 25, 2015.
- Allergan plc SEC Form S-3ASR filed on February 16, 2018.

#### **Security Data**

- Historical data for Allergan plc Common and Preferred Stock, companies comprising the Peer Index, and the S&P 500 Total Return Index were obtained from S&P Capital IQ.
- Shares Outstanding for Allergan plc Common and Preferred Stock were obtained from Actavis plc and Allergan plc SEC filings submitted throughout the Class Period.
- The Dow Jones U.S. Pharmaceutical Index membership data during the Class Period were purchased from Refinitiv.
- Trade and quote data for Allergan plc Common Stock and Preferred Stock during the Class Period and one hundred randomly selected companies trading on the New York Stock Exchange and NASDAQ for October 2015 were obtained from Tick Data, *see*



<https://tickapi.tickdata.com/>. Companies trading on the New York Stock Exchange and NASDAQ for October 2015 were identified using Thomson Reuters Eikon.

- Institutional and insider holdings data was obtained from S&P Capital IQ.
- Allergan plc Common Stock options data was obtained from iVolatility.
- Allergan plc Common Stock market makers data was obtained from Bloomberg, using the RANK function.
- Allergan plc Common Stock and Preferred Stock market capitalization percentiles were obtained from Bloomberg.
- Turnover velocity data for NYSE and NASDAQ were obtained from the World Federation of Exchanges, *see* <https://www.world-exchanges.org/home/index.php/statistics/monthly-reports>.

### **Allergan plc News**

- Allergan plc news headlines and select articles downloaded from Factiva for the Class Period. The Factiva search for news over the Class Period resulted in 12,581 unique articles (and 9,444 articles over the Analysis Period). These news articles were identified according to sets of search terms applied over date ranges determined by the Corporate Action Events listed in Section IV. The sets of search terms are outlined in Section IV.C. The searches were performed within “Major News Sources,” and excluded titles that included “DIARY-S&P 500 EARNINGS MONTH AHEAD,” “DIARY - U.S. Company Conference Calls/Webcast for week ahead,” “DIARY-U.S. MEETINGS/WEEK AHEAD,” “DIARY - U.S. Company Conf Calls/Webcast for week ahead – II,” “DIARY-U.S. MEETINGS/WEEK AHEAD – II,” and “NYSE New 52-Week Highs And Lows.” Duplicate articles have been removed by a proprietary function accessible in Factiva’s search builder. Since, Allergan Preferred Stock trading data begins February 25, 2015, articles found before this date are not included in the Analysis Period count. The news articles include, but are not limited to:
  - "Allergan Shares Tumble on News of Anti-Inversion Rules -- Market Talk," *Dow Jones Institutional News*, November 18, 2018 4:58 PM EST.
  - "EXCLUSIVE-Pfizer, Allergan CEOs agree on combined company roles - sources," *Reuters News*, November 20, 2015, 1:38 PM EST.
  - "New Inversion Rules Could Snag Pfizer/Allergan -- Market Talk," *Dow Jones Institutional News*, April 4, 2016, 5:31 PM EST.
  - “Pfizer & Allergan are Going to Merge and There's Nothing the IRS Can Do -- Barron's Blog,” *Dow Jones Institutional News*, November 20, 2015, 3:28 PM EST.
  - "Pfizer Reports Positive Topline Results from Phase 3 Trial Comparing XALKORI(R) (crizotinib) to Chemotherapy in Previously Untreated East Asian Patients with ALK-Positive Advanced Non-Small Cell Lung Cancer (NSCLC)," *Business Wire*, November 18, 2018 8:00 AM EST.

- *"\*Merck KGaA, Darmstadt, Germany, And Pfizer Receive FDA Breakthrough Therapy Designation For Avelumab In Metastatic Merkel Cell Carcinoma >PFE," Dow Jones Institutional News, November 18, 2018, 7:00 AM EST.*
- Allergan plc earnings conference call and investor call transcripts during the Class Period, including but not limited to:
  - *"Actavis plc Q1 2014 Earnings Call," S&P Capital IQ, April 30, 2014.*
- Allergan plc press releases during the Class Period, including but not limited to:
  - *"(PR) Actavis to Acquire Forest Laboratories, Inc. for \$25 Billion in an Equity and Cash Transaction," PR Newswire, February 18, 2014, 7:01 AM EST.*
  - *"Actavis Completes Allergan Acquisition," PR Newswire, March 17, 2015, 8:55 AM EST.*
  - *"Actavis Completes Forest Laboratories Acquisition," PR Newswire, July 1, 2014, 8:20 AM EST.*
  - *"Actavis to Acquire Allergan to Create Top 10 Global Growth Pharmaceutical Company with \$23 Billion in Revenue," PR Newswire, November 17, 2014, 9:15 AM EST.*
  - *"Allergan Accelerates Transformation to Branded Growth Pharma Leader by Divesting Global Generics Business to Teva for \$40.5 Billion," PR Newswire, July 27, 2015, 4:37 AM EST.*
  - *"Allergan plc Completes Divestiture of Global Generics Business to Teva Pharmaceuticals," PR Newswire, August 2, 2016, 12:41 PM EST.*
  - *"Allergan plc Confirms Discussions Regarding Potential Business Combination Transaction With Pfizer Inc.," PR Newswire, October 29, 2015, 9:30 AM EST.*
  - *"Allergan Reiterates Strong Standalone Growth Profile and Strategy Following Termination of Pfizer Transaction," PR Newswire, April 6, 2016 6:45 AM EST.*

#### **Allergan plc Analyst Reports**

- Allergan plc analyst reports supplied by Investext via Thomson Reuters and Counsel for the Class Period, including but not limited to:
  - *"1Q Upside; Solid Visibility on LT Double Digit Growth; Staying Bullish," Piper Jaffray, April 30, 2014.*
  - *"1Q/14 First Glance: EPS Upside Driven by Lower Opex and Tax - ALERT," J.P. Morgan, April 30, 2014.*
  - *"AGN: Good Combo: Q1 Results, Pipeline Progress And \$10B Buyback," Wells Fargo, May 10, 2016.*
  - *"Good Q, Raising EPS on buyback program," Deutsche Bank, May 10, 2016.*
- Allergan, Inc., Forest Laboratories, Inc., and Pfizer Inc. analyst report titles and dates supplied by Investext.

### Academic Articles

- Aharony, J., and Swary, I., “Quarterly Dividend and Earnings Announcements and Stockholders’ Returns: An Empirical Analysis,” *The Journal of Finance*, Vol. 35, No. 1, March 1980.
- Aktas, N., et al., *Event studies with a contaminated estimation period*, *Journal of Corporate Finance*. 13. (2007)
- Amihud, Y., et al., *Liquidity and Asset Prices*, 1 *FOUND. & TRENDS FIN.* 269 (2005).
- Avramov, D., et al., *Liquidity and Autocorrelations in Individual Stock Returns*, 61 *J. FIN.* (2006).
- Barber, B., et al., *The Fraud-on-the-Market Theory and the Indicators of Common Stocks’ Efficiency*, 19 *J. CORP. L.* 285 (1994).
- Beaver, William H., “The Information Content of Annual Earnings Announcements,” *Empirical Research in Accounting: Selected Studies, 1968*, supplement to the *Journal of Accounting Research*, Vol. 6, 1968.
- Binder, J., *The Event Study Methodology Since 1969*, 11 *REV. QUANTITATIVE FIN. & ACCT.* (1998).
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- May, R., “The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes,” *Empirical Research in Accounting: Selected Studies, 1971*, supplement to the *Journal of Accounting Research*, Vol. 9, 1971.
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- Thomas, R., and Cotter, J., *Measuring Securities Market Efficiency in the Regulatory Setting*, 63 LAW & CONTEMP. PROBS. 105 (2000).

### **Other**

- <https://www.world-exchanges.org/home/index.php/statistics/monthly-reports>.
- <http://www.rss-specifications.com/>
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- <http://www.sec.gov/answers/mktmaker.htm>
- <https://www.nasdaqtrader.com/Trader.aspx?id=TradingUSEquities>
- <https://www.nyse.com/market-model>
- <https://www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0001578845&type=S-3&dateb=&owner=exclude&count=40>
- SEC Form S-3 eligibility information from [www.sec.gov/about/forms/forms-3.pdf](http://www.sec.gov/about/forms/forms-3.pdf)

## **APPENDIX B**

### **CHAD W. COFFMAN, MPP, CFA**

Global Economics Group, LLC  
140 South Dearborn Street, Suite 1000  
Chicago, IL 60603  
Office: (312) 470-6500  
Mobile: (815) 382-0092  
Email: ccoffman@globaleconomicsgroup.com

#### **EMPLOYMENT:**

##### **Global Economics Group, LLC**

President (2008 - Current)

Global Economics Group specializes in the application of economics, finance, statistics, and valuation principles to questions that arise in a variety of contexts, including litigation and policy matters throughout the world. With offices in Chicago, Boston, and New York, Principals of Global Economics Group have extensive experience in high-profile securities, antitrust, labor, and intellectual property matters.

##### **Market Platform Dynamics, LLC**

Chief Financial Officer & Chief Operating Officer (2010 – Current)

Market Platform Dynamics is a management consulting firm that specializes in assisting platform-based companies profit from industry disruption caused by the introduction of new technologies, new business models and/or new competitive threats. MPD's experts include economists, econometricians, product development specialists, strategic marketers and recognized thought leaders who apply cutting-edge research to the practical problems of building and running a profitable business.

##### **Chicago Partners, LLC**

Principal (2007 – 2008)  
Vice President (2003 – 2007)  
Director (2000 – 2003)  
Senior Associate (1999 – 2000)  
Associate (1997 – 1999)  
Research Analyst (1995 – 1997)

#### **EDUCATION:**

**CFA** Chartered Financial Analyst, 2003

**M.P.P.** University of Chicago, 1997

Masters of Public Policy, with a focus in economics including coursework in Finance, Labor Economics, Econometrics, and Regulation

**B.A.** Knox College, 1995  
Economics, Magna Cum Laude  
Graduated with College Honors for Paper entitled “Increasing Efficiency in Water Supply Pricing: Using Galesburg, Illinois as a Case Study”  
Dean's List Every Term  
Phi Beta Kappa

## **PROFESSIONAL EXPERIENCE:**

### Securities, Valuation, and Market Manipulation Cases:

- Testifying Expert in numerous high-profile class action securities matters including, but not limited to:
  - In Re: Bank of America Corp. Securities, Derivative, and Employee Retirement Income Security Act (ERISA) Litigation. Parties settled for \$2.4 billion in which I served as Plaintiffs’ damages and loss causation expert.
  - In Re: Schering-Plough Corporation/ Enhance Securities Litigation. Parties settled for \$473 million in which I served as Plaintiffs’ damages and loss causation expert.
  - In Re: REFCO Inc. Securities Litigation. Parties settled for \$367 million in which I served as Plaintiffs’ damages and loss causation expert.
  - In Re: Computer Sciences Corporation Securities Litigation. Parties settled for \$98 million in which I served as Plaintiffs’ damages and loss causation expert.
  - Full list of testimonial experience is provided below
- Engaged several dozen times as a neutral expert by prominent mediators to evaluate economic analyses of other experts.
- Expert consultant for the American Stock Exchange (AMEX) where I evaluated issues related to multiple listing of options. Performed econometric analysis of various measures of option spread using tens of millions of trades.
- Performed detailed audit of CDO valuation models employed by a banking institution to satisfy regulators – non-litigation matter.
- Played significant role in highly-publicized internal accounting investigations of two Fortune 500 companies. One led to restatement of previously issued financial statements and both involved SEC investigations.

### **Testimony:**

- Testifying expert in the matter of Kuo, Steven Wu v. Xceedium Inc, Supreme Court of New York, County of New York, Index No. 06-100836. Filed report re: the fair value of Mr. Kuo’s shares. Case settled at trial.

- Testifying expert in the matter of Pallas, Dennis H. v. BPRS/Chestnut Venture Limited Partnership and Gerald Nudo, Circuit Court of Cook County, Illinois, County Department, Chancery Division. Filed report re: fair value of Pallas shares. Report: July 9, 2008. Deposition August 6, 2008. Court Testimony February 11, 2009.
- Testifying expert in Washington Mutual Securities Litigation, United States District Court for the Western District of Washington at Seattle, No. 2:08-md-1919 MJP, Lead Case No. C08-387 MJP. Filed declaration August 5, 2008 re: Plaintiffs' loss causation theory. Filed expert report April 30, 2010. Filed expert rebuttal report August 4, 2010. Filed declaration re: Plan of Allocation September 25, 2011.
- Testifying expert in DVI Securities Litigation, Case No. 2:03-CV-05336-LDD, United States District Court for the Eastern District of Pennsylvania. Filed expert report October 1, 2008 re: damages. Filed expert rebuttal report December 17, 2008. Deposition January 27, 2009. Filed expert rebuttal report June 24, 2013.
- Testifying expert in Syrtech Corporation v. Lifetime Brands, Inc. and Syrtech Acquisition Corporation, Supreme Court of the State of New York, Index No. 603568/2007. Filed expert report October 31, 2008.
- Expert declaration in Jacksonville Police and Fire Pension Fund, et al. v. AIG, Inc., et al., No. 08-CV-4772-LTS; James Connolly, et al. v. AIG, Inc., et al., No. 08-CV-5072-LTS; Maine Public Employees Retirement System, et al. v. AIG, Inc., et al., No. 08-CV-5464-LTS; and Ontario Teachers' Pension Plan Board, et al. v. AIG, Inc., et al., No. 08-CV-5560-LTS, United States District Court for the Southern District of New York. Filed declaration February 18, 2009.
- Expert declaration in Connetics Securities Litigation, Case No. C 07-02940 SI, United States District Court for the Northern District of California, San Francisco Division. Filed expert report March 16, 2009. Filed declaration re: Plan of Allocation September 9, 2009.
- Testifying expert in Boston Scientific Securities Litigation, Master File No. 1:05-cv-11934 (DPW), United States District Court District of Massachusetts. Filed expert report August 6, 2009. Deposition October 6, 2009.
- Expert declaration in Louisiana Sheriffs' Pension and Relief Fund, et al. v. Merrill Lynch & Co, Inc., et al., Case Number 08-cv-09063, United States District Court for the Southern District of New York. Filed declaration re: Plan of Allocation October, 2009.
- Testifying expert in Henry J. Wojtunik v. Joseph P. Kealy, John F. Kealy, Jerry A. Kleven, Richard J. Seminoff, John P. Stephen, C. James Jensen, John P. Morbeck, Terry W. Beiriger, and Anthony T. Baumann. Filed expert report January 25, 2010.
- Testifying expert in REFCO Inc. Securities Litigation, Case No. 05 Civ. 8626 (GEL), United States District Court for the Southern District of New York. Filed expert report February 2, 2010. Filed expert rebuttal report March 12, 2010. Deposition March 26, 2010.



- Expert declaration in New Century Securities Litigation, Case No. 07-cv-00931-DDP, United States District Court Central District of California. Filed declaration March 11, 2010.
- Testifying expert in Louisiana Municipal Police Employees' Retirement System, et al. v. Tilman J. Fertitta, Steven L. Scheinthal, Kenneth Brimmer, Michael S. Chadwick, Michael Richmond, Joe Max Taylor, Fertitta Holdings, Inc., Fertitta Acquisition Co., Richard Liem, Fertitta Group, Inc. and Fertitta Merger Co, C.A. No. 4339-VCL, Court of Chancery of the State of Delaware. Filed expert report April 23, 2010.
- Testifying expert in Edward E. Graham and William C. Nordlund, individually and d/b/a Silver King Capital Management v. Eton Park Capital Management, L.P., Eton Park Associates, L.P. and Eton Park Fund, L.P. Case No. 1:07-CV-8375-GBD, Circuit Court of Shelby County, Alabama. Filed expert rebuttal report July 8, 2010. Deposition September 1, 2010. Filed supplemental expert rebuttal report August 22, 2011.
- Testifying expert in Moody's Corporation Securities Litigation. Case No. 1:07-CV-8375-GBD), United States District Court for the Southern District of New York. Filed expert rebuttal report August 23, 2010. Deposition October 7, 2010. Filed rebuttal reply report November 5, 2010. Filed expert report May 25, 2012.
- Testifying expert in Minneapolis Firefighters' Relief Association v. Medtronic, Inc., et al. Civil No. 08-6324 (PAM/AJB), United States District Court, District of Minnesota. Filed expert report January 14, 2011.
- Testifying expert in Schering-Plough Corporation/ENHANCE Securities Litigation Case No.2:08-cv-00397 (DMC) (JAD), United States District Court, District of New Jersey. Filed declaration February 7, 2011. Filed expert report September 15, 2011. Filed expert rebuttal report October 28, 2011. Filed declaration January 30, 2012. Deposition November 15, 2011 and November 29, 2011.
- Testifying expert in Fannie Mae 2008 Securities Litigation, Master File No. 08 Civ. 7831 (PAC), United States District Court for the Southern District of New York. Filed expert report July 18, 2011.
- Expert declaration in Grady Scott Weston et. al v. RCS Capital Corporation, et. al, Civil Action No. 1:14-CV-10136-GBD, United States District Court for the Southern District of New York. Filed declaration re: aggregate damages August 11, 2017.
- Testifying expert in Bank of America Corp. Securities, Derivative, and Employee Retirement Income Security Act (ERISA) Litigation, Master File No. 09 MDL 2058 (PKC), United States District Court for the Southern District of New York. Filed expert report August 29, 2011. Filed expert rebuttal report September 26, 2011. Filed expert report March 16, 2012. Filed expert rebuttal report April 9, 2012. Filed expert rebuttal report April 29, 2012. Deposition October 14, 2011 and May 24, 2012.



- Testifying expert in Toyota Motor Corporation Securities Litigation, Case No. 10-922 DSF (AJWx), United States District Court, Central District of California. Filed expert report February 17, 2012. Deposition March 28, 2012. Filed expert rebuttal report August 2, 2012. Filed declaration re: Plan of Allocation January 28, 2013.
- Testifying expert in The West Virginia Investment Management Board and the West Virginia Consolidated Public Retirement Board v. The Variable Annuity Life Insurance Company, Civil No. 09-C-2104, Circuit Court of Kanawha County, West Virginia. Filed expert report June 1, 2012. Depositions June 19, 2013 and December 11, 2015.
- Testifying expert in Aracruz Celulose S.A. Securities Litigation, Case No. 08-23317-CIV-LENARD, United States District Court for the Southern District of Florida. Filed expert report July 20, 2012. Deposition September 14, 2012. Filed expert rebuttal report October 29, 2012. Filed declaration re: Plan of Allocation May 20, 2013.
- Testifying expert in In Re Computer Sciences Corporation Securities Litigation, CIV. A. No. 1:11-cv-610-TSE-IDD, United States District Court for the Eastern District of Virginia, Alexandria Division. Filed expert report November 9, 2012. Filed supplemental report February 18, 2013. Filed expert rebuttal report March 25, 2013. Deposition March 27, 2013. Filed declaration re: Plan of Allocation August 7, 2013.
- Testifying expert in In Re Weatherford International Securities Litigation, Case 1:11-cv-01646-LAK, United States District Court for the Southern District of New York. Filed declaration July 1, 2011. Filed expert report April 1, 2013. Deposition April 26, 2013.
- Testifying expert in In Re: Regions Morgan Keegan Closed-End Fund Litigation, Case 2:07-cv-02830-SHM-dkv, United States District Court for the Western District of Tennessee, Western Division. Court testimony April 12, 2013.
- Testifying expert in City of Roseville Employees' Retirement System and Southeastern Pennsylvania Transportation Authority, derivatively on behalf of Oracle Corporation, Plaintiff, v. Lawrence J. Ellison, Jeffrey S. Berg, H. Raymond Bingham, Michael J. Boskin, Safra A. Catz, Bruce R. Chizen, George H. Conrades, Hector Garcia-Molina, Donald L. Lucas, and Naomi O. Seligman, Defendants, and Oracle Corporation, Nominal Defendant, C.A. No. 6900-CS, Court of Chancery of the State of Delaware. Filed expert report May 13, 2013. Filed expert rebuttal report June 21, 2013. Deposition July 17, 2013.
- Testifying expert in In Re BP plc Securities Litigation, No. 4:10-md-02185, Honorable Keith P. Ellison, United States District Court for the Southern District of Texas, Houston Division. Filed expert report June 14, 2013. Deposition July 25, 2013. Filed expert rebuttal report October 7, 2013. Filed declaration re: Plaintiff accounting losses November 17, 2013. Filed expert report January 6, 2014. Deposition January 22, 2014. Filed expert rebuttal report March 12, 2014. Filed expert report March 17, 2014. Hearing testimony April 21, 2014. Deposition June 3, 2014. Filed declaration re: damages June 3, 2014.

- Testifying expert in In Re Celestica Inc. Securities Litigation, Civil Action No. 07-CV-00312-GBD, United States District Court for the Southern District of New York. Filed expert report June 14, 2013. Filed expert rebuttal report September 10, 2013. Deposition September 24, 2013.
- Testifying expert in In Re Dendreon Corporation Class Action Litigation, Master Docket No. C11-01291JLR, United States District Court for the Western District of Washington at Seattle. Filed declaration re: Plan of Allocation June 14, 2013.
- Testifying expert in In Re Hill v. State Street Corporation, Master Docket No. 09-cv12146-GAO, United States District Court for the District of Massachusetts. Filed expert report October 28, 2013.
- Testifying expert in In Re BNP Paribas Mortgage Corporation and BNP Paribas v. Bank of America, N.A., Master Docket No. 09-cv-9783-RWS, United States District Court for the Southern District of New York. Filed expert report November 25, 2013. Filed expert rebuttal report March 17, 2014. Deposition June 26-27, 2014.
- Testifying expert in Stan Better and YRC Investors Group v. YRC Worldwide Inc., William D. Zollars, Michael Smid, Timothy A. Wicks and Stephen L. Bruffet, Civil Action No. 11-2072-KHV, United States District Court for the District of Kansas. Filed declaration re: Plan of Allocation February 5, 2014. Filed expert report May 29, 2015. Filed expert report February 5, 2016. Filed expert rebuttal report March 27, 2016.
- Testifying expert in The Archdiocese of Milwaukee Supporting Fund v. Halliburton Company, et al., Civil Action No. 3:02-CV-1152-M, United States District Court for the Northern District of Texas, Dallas Division. Filed expert rebuttal report October 30, 2014. Deposition November 11, 2014. Hearing testimony December 1, 2014. Filed expert report March 11, 2016. Filed expert rebuttal report May 13, 2016. Deposition June 10, 2016. Hearing testimony re: Plan of Allocation July 31, 2017.
- Testifying expert in In Re HP Securities Litigation, Master File No. 3:12-cv-05980-CRB, United States District Court for the Northern District of California, San Francisco Division. Filed expert report November 4, 2014. Deposition December 3, 2014. Filed expert rebuttal report January 26, 2015.
- Testifying expert in In Re MGM Mirage Securities, No. 2:09-cv-01558-GMN-VCF, United States District Court for the District of Nevada. Filed expert report November 12, 2014. Deposition January 6, 2015. Filed expert rebuttal report April 2, 2015.
- Testifying expert in Adam S. Levy v. Thomas Gutierrez, Richard J. Gaynor, Raja Bal, J. Michal Conaway, Kathleen A. Cote, Ernest L. Godshalk, Matthew E. Massengill, Mary Petrovich, Robert E. Switz, Noel G. Watson, Thomas Wroe, Jr., Morgan Stanley & Co. LLC, Goldman, Sachs & Co., and Canaccord Genuity Inc. and Apple Inc., No. 1:14-cv-00443-JL, United States District Court for the District of New Hampshire. Filed declaration January 7, 2015. Filed expert report September 20, 2018. Deposition December 7, 2018. Filed expert rebuttal report February 22, 2019. Filed expert report June 7, 2019. Deposition September 6, 2019.

- Testifying expert in In Re Nu Skin Enterprises, Inc., Securities Litigation, Master File No. 2:14-cv-00033-DB, United States District Court for the District of Utah, Central Division. Filed expert report June 26, 2015. Deposition August 17, 2015.
- Testifying expert in In Re Intuitive Surgical Securities Litigation, Master File No. 5:13-cv-01920-EJD, United States District Court for the Northern District of California. Filed expert report September 1, 2015. Filed expert rebuttal report November 16, 2015. Filed expert report November 8, 2016. Filed expert report February 8, 2017. Deposition December 12, 2017.
- Testifying expert in Babak Hatamian, et al., v. Advanced Micro Devices, Inc., et al., No. 4:14-cv-00226-YGR, United States District Court for the Northern District of California, San Francisco Division. Filed expert report September 4, 2015. Filed expert rebuttal report December 7, 2015. Filed expert report November 18, 2016. Filed expert rebuttal report January 17, 2017. Filed declaration March 6, 2017. Deposition March 7, 2017.
- Testifying expert in In Re NII Holdings, Inc. Securities Litigation, No. 1:14-cv-00227-LMB-JFA, United States District Court for the Eastern District of Virginia, Alexandria Division. Filed expert report September 11, 2015. Deposition September 17, 2015. Filed expert rebuttal report October 28, 2015. Filed expert report January 8, 2016.
- Testifying expert in In Re Barrick Gold Securities Litigation, No. 1:13-cv-03851-SAS, United States District Court for the Southern District of New York. Filed expert report September 15, 2015.
- Expert declaration in In Re Tower Group International, Ltd. Securities Litigation, Master Docket No. 1:13-cv-5852-AT, United States District Court for the Southern District of New York. Filed declaration re: Plan of Allocation October 6, 2015.
- Testifying expert in Beaver County Employees' Retirement Fund et al. v. Tile Shop Holdings Inc. et al., No. 0:14-cv-00786-ADM-TNL, United States District Court for the District of Minnesota. Filed expert report December 1, 2015. Deposition March 15, 2016. Filed expert report July 1, 2016. Deposition July 26, 2016. Filed expert reply report August 15, 2016.
- Testifying expert in In Re Barclays Bank PLC Securities Litigation, Civil Action No. 1:09-cv-01989-PAC, United States District Court for the Southern District of New York. Filed expert report December 15, 2015. Filed expert rebuttal report February 2, 2016. Filed rebuttal reply expert report March 18, 2016. Deposition April 21, 2016.
- Testifying expert in In Re Petrobras Securities Litigation, Civil Action No. 15-cv-03733-JSR, 15-cv-07615-JSR, 15-cv-6618-JSR, 15-cv-02192-JSR, United States District Court for the Southern District of New York. Filed expert report May 6, 2016. Filed expert report May 27, 2016. Filed expert reply report June 17, 2016. Deposition June 24, 2016.
- Testifying expert in In Re Genworth Financial, Inc. Securities Litigation, Civ. A. No. 3:14-cv-00682-JAG, United States District Court for the Eastern District of Virginia, Richmond Division. Filed declaration re: Plan of Allocation June 2, 2016.

- Testifying expert in Zubair Patel, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. L-3 Communications Holdings, Inc., et al., Defendants, No. 1:14-cv-06038-VEC, United States District Court for the Southern District of New York. Filed expert report June 30, 2016. Deposition July 20, 2016. Filed expert rebuttal report August 26, 2016.
- Testifying expert in Leonard Howard, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Liquidity Services, Inc., et al., Defendants, No. 1:14-cv-01183-BAH, United States District Court for the District of Columbia. Filed expert report September 2, 2016.
- Testifying expert in James Quinn, Derivatively on Behalf of Nominal Defendant Apple REIT Ten, Inc., Plaintiff, v. Glade M. Knight, Justin Knight, Kent W. Colton, R. Garnett Hall, Jr., David J. Adams, Anthony F. Keating III, David Buckley, Kristian Gathright, David McKenney, Bryan Peery, and Apple Hospitality REIT, Inc., Defendants, and Apple REIT Ten, Inc., Nominal Defendant, No. 3:16-cv-610, United States District Court for the Eastern District of Virginia, Richmond Division. Filed expert report October 14, 2016. Deposition October 20, 2016.
- Testifying expert in Dr. Joseph F. Kasper, et al., Plaintiff, v. AAC Holdings, Inc., et al., Defendants, No. 3:15-cv-00923, United States District Court for the Middle District of Tennessee, Nashville Division. Filed expert report October 18, 2016. Deposition November 29, 2016. Filed expert rebuttal report February 10, 2017. Filed expert report December 4, 2017.
- Testifying expert in KBC Asset Management NV, et al., Plaintiff, v. 3D Systems Corporation, Abraham N. Reichental, Damon J. Gregoire, and Ted Hull, Defendants, No. 15-cv-02393-MGL, United States District Court for the District of South Carolina, Rock Hill Division. Filed expert report October 31, 2016. Deposition January 5, 2017. Filed expert report April 21, 2017.
- Testifying expert in Arkansas Teacher Retirement System, et al., Plaintiff, v. Virtus Investment Partners, Inc., Defendants, No. 15-cv-1249-WHP, United States District Court for the Southern District of New York. Filed expert report November 7, 2016. Filed expert rebuttal report February 17, 2017. Deposition February 28, 2017. Filed expert report June 16, 2017. Filed expert rebuttal report July 26, 2017. Deposition August 9, 2017. Filed declaration re: prior reports December 4, 2017.
- Testifying expert in Laborers Pension Trust Fund – Detroit, Individually and on Behalf of All Others Similarly Situated, Plaintiffs, vs. Conn’s, Inc., et al., Defendants, No. 4:14-cv-00548 (KPE), United States District Court for the Southern District of Texas, Houston Division. Filed expert report November 10, 2016. Deposition December 9, 2016. Filed expert rebuttal report March 27, 2017.
- Testifying expert in Glen Hartsock, individually and on behalf of all others similarly situated Plaintiff, v. Spectrum Pharmaceuticals, Inc., and Rajesh C. Shrotriya, Defendants, No. 16-cv-02279-RFB-GWF and Olutayo Ayeni, individually and on behalf of all others similarly situated Plaintiff, v. Spectrum Pharmaceuticals, Inc., Rajesh C. Shrotriya, Kurt A. Gustafson, Joseph Turgeon, and Lee Allen, Defendants, No. 16-cv-02649-KJD-VCF, United States District Court for the District of Nevada. Filed declaration re: damages December 8, 2016.

- Testifying expert in In Re: ARIAD Pharmaceuticals, Inc. Securities Litigation, No. 1:13-cv-12544 (WGY), United States District Court District of Massachusetts. Filed expert report March 6, 2017.
- Testifying expert in Washtenaw County Employees' Retirement System, individually and on behalf of all others similarly situated, Plaintiff, v. Walgreen Co., Gregory D. Wasson, and Wade Miquelon, Defendants, No. 15-cv-3187, United States District Court for the Northern District of Illinois. Filed expert report April 21, 2017. Deposition June 15, 2017. Filed expert rebuttal report September 15, 2017.
- Testifying expert in Lou Baker, individually and on behalf of all others similarly situated, Plaintiff, v. SeaWorld Entertainment, Inc., James Atchison, James M. Heaney, Marc Swanson, and The Blackstone Group L.P., Defendants, No. 3:14-cv-02129-MMA-KSC, United States District Court for the Southern District of California. Filed expert report May 19, 2017. Deposition July 20, 2017. Filed expert rebuttal report September 14, 2017. Filed expert report January 22, 2019. Filed expert rebuttal report March 1, 2019. Deposition March 26, 2019.
- Testifying expert in Benjamin Gross, individually and on behalf of all others similarly situated, Plaintiff, v. GFI Group, Inc., Colin Heffron, and Michael Gooch, Defendants, No. 3:14-cv-09438-WHP, United States District Court for the Southern District of New York. Filed expert report May 30, 2017. Filed expert report August 7, 2017. Filed expert rebuttal report August 28, 2017. Deposition September 27, 2017.
- Testifying expert in Murray Rubinstein, Jeffrey F. St. Clair, William McWade, Harjot Dev and Vikas Shah, individually and on behalf of all others similarly situated, Plaintiffs, v. Richard Gonzalez and Abbvie Inc., Defendants, No. 14-cv-9465, United States District Court for the Northern District of Illinois, Eastern Division. Filed expert report December 21, 2017. Deposition February 22, 2018. Filed supplemental expert report March 9, 2018. Filed expert reply report June 14, 2018. Filed expert sur-sur reply report August 28, 2018.
- Testifying expert in In Re: SanDisk LLC Securities Litigation, No. 3:15-cv-01455-VC, United States District Court for the Northern District of California, San Francisco Division. Filed expert report January 19, 2018. Filed expert report August 30, 2018. Filed expert report October 23, 2018. Deposition November 15, 2018.
- Testifying expert in In Re: EZCORP, Inc. Securities Litigation, No. 1:15-cv-00608-SS, United States District Court for the Western District of Texas. Filed expert report January 31, 2018. Deposition March 6, 2018.
- Testifying expert in Kevin Murphy, Individually and On Behalf of All Others Similarly Situated, Plaintiff, v. Precision Castparts Corp., Mark Donegan, and Shawn R. Hagel, Defendants, No. 3:16-cv-00521-SB, United States District Court for the District of Oregon, Portland Division. Filed expert report March 2, 2018. Filed expert report March 22, 2019. Filed expert reply report June 19, 2019. Deposition July 19, 2019.



- Testifying expert in In Re: Rent-A-Center, Inc. Securities Litigation, No. 4:16-cv-00978-ALM-MCMC, United States District Court for the Eastern District of Texas, Sherman Division. Filed expert report March 13, 2018. Filed rebuttal reply report July 12, 2018. Deposition August 21, 2018.
- Testifying expert in Public Employees' Retirement Systems of Mississippi, Individually and On Behalf of All Others Similarly Situated, Plaintiff, v. TreeHouse Foods, Inc., Sam K. Reed, Dennis F. Riordan and Christopher D. Silva, Defendants, No. 1:16-cv-10632, United States District Court for the Northern District of Illinois. Filed expert report July 13, 2018. Deposition September 21, 2018. Filed rebuttal reply report May 17, 2019.
- Testifying expert in Gary Hefler, et al., Plaintiffs, v. Wells Fargo & Company, et al., Defendants, No. 1:16-cv-05479-JST, United States District Court for the Northern District of California. Filed declaration re: Plan of Allocation July 27, 2018.
- Testifying expert in In re Banco Bradesco S.A. Securities Litigation, No. 1:16-cv-04155-GHW, United States District Court for the Southern District of New York. Filed expert report August 17, 2018. Filed supplemental expert report October 11, 2018. Deposition October 12, 2018. Filed expert report December 14, 2018. Filed expert report March 8, 2019.
- Testifying expert in Richard Di Donato, et al., Plaintiffs, v. Insys Therapeutics Incorporated, et al. Defendants, No. CV-16-00302-PHX-NVW, United States District Court for the District of Arizona. Filed expert report August 31, 2018. Deposition October 4, 2018. Filed expert report November 30, 2018. Filed expert report July 26, 2019. Filed expert report November 1, 2019.
- Consulting expert in In Re: Wilmington Trust Securities Litigation, Master File No. 10-cv-00990-ER, United States District Court for the District of Delaware. Filed declaration re: Plan of Allocation and calculation of aggregate damages September 17, 2018.
- Testifying expert in Atul Singh Deora, Individually and On Behalf of All Others Similarly Situated, Plaintiffs, v. Nanthealth, Inc., Patrick Soon-Shiong, Paul A. Holt, Michael S. Sitrick, Kirck K. Calhoun, Mark Bennett, Edward Miller, Michael Blaszyk, Jefferies Llc, First Analysis Securities Corporation, Canaccord Genuity Inc., And Fbr Capital Markets & CO., Defendants., No. 2:17-CV-01825-BRO-MRW, United States District Court for the Central District of California Western Division. Filed expert report September 20, 2018.
- Testifying expert in City of Sunrise General Employees' Retirement Plan, Plaintiff vs. FleetCor Technologies, Inc., et al., Defendants, No. 1:17-CV-02207-LMM, United States District Court for the Northern District of Georgia Atlanta Division. Filed expert report January 4, 2019. Deposition March 20, 2019. Filed expert report May 6, 2019.
- Testifying expert in Guevoura Fund LTD., On Behalf of Itself and All Others Similarly Situated, Plaintiffs, v. Robert F.X. Sillerman, D. Geoffrey Armstrong, John Miller, Michael John Meyer, and SFX Entertainment, Inc., Defendants, Case No. 1:15-cv-07192-CM, Case No. 1:18-cv-09784-CM, United States District Court for the Southern District of New York. Filed expert report January 18, 2019.

- Testifying expert in Leon D. Milbeck On Behalf of Himself and All Others Similarly Situated, v. TrueCar, Inc, et al., Defendants, No. 2:18-cv-02612-SVW, United States District Court for the Central District of California. Filed expert report March 8, 2019. Deposition April 8, 2019.
- Testifying expert in Lewis Cosby, Kenneth R. Martin, as Beneficiary of the Kenneth Ray Martin Roth IRA, and Martin Weakly On Behalf of Themselves and All Others Similarly Situated, vs. KPMG, LLP, Case No. 3:16-cv-00121, United States District Court for the Eastern District of Tennessee, Knoxville Division. Filed expert report March 15, 2019. Deposition April 12, 2019. Filed supplemental expert report April 19, 2019. Deposition April 25, 2019. Filed rebuttal reply report June 14, 2019.
- Testifying expert in Shawn Sanawaz, Individually and On Behalf of All Other Similarly Situated, v. Intellipharma International Inc., Isa Odidi, and Domenic Della Penna, Defendants, No. 1:17-cv-05761-JPO, United States District Court for the Southern District of New York. Filed expert report May 06, 2019.
- Testifying expert in Kevin L. Dougherty, Individually and on Behalf of All Others Similarly Situated, v. Esperion Therapeutics, Inc., et al., Defendants, No. 2:16-cv-10089-AJT-RSW, United States District Court for the Eastern Michigan of Michigan. Filed expert report June 6, 2019. Deposition July 26, 2019. Filed rebuttal reply report October 7, 2019.
- Testifying expert in West Virginia Investment Management Board, Sticking Blue Sky Global Equity Active Low Volatility Fund, and Sticking Blue Sky Active Large Cap Equity USA Fund vs. SCANA Corporation., et al., Civ. A. No. 3:17-cv-2616-MBS, United States District Court for the District of South Carolina. Filed expert report June 28, 2019. Deposition August 16, 2019.
- Testifying expert in Eric Weiner, Individually and on Behalf of All Others Similarly Situated, vs. Tivity Health, Inc., Donato Tramuto, Glenn Hargreaves and, Adam Holland, Defendants, Case No.: 3:17-cv-01469 United States District Court for the Middle District of Tennessee. Filed expert report July 1, 2019. Deposition September 4, 2019. Filed rebuttal reply report December 20, 2019.
- Testifying expert in In Re Dr. Reddy's Laboratories Limited Securities Litigation, No. 3:17-cv-06436-PGS-DEA, United States District Court for the District of New Jersey. Filed expert report July 19, 2019. Deposition September 10, 2019.
- Testifying expert in Peace Officers' Annuity and Benefit Fund of Georgia, Individually and On Behalf of All Others Similarly Situated, and Jacksonville Police and Fire Pension Fund, Individually and On Behalf of All Others Similarly Situated vs. DaVita, Inc. et al., No. 1:17-cv-00304-WJM-NRN, United States District Court for the District of Colorado. Filed expert report January 31, 2020.
- Testifying Expert in In Re Avon Securities Litigation, No. 19 Civ. 01420- CM, United States District Court for the Southern District of New York. Filed expert report February 13, 2020.

Experience in Labor Economics and Discrimination-Related Cases:

- Expert consultant for Cargill in class action race discrimination matter in which class certification was defeated.
- Expert consultant for 3M in class action age discrimination matter.
- Expert consultant for Wal-Mart in class action race discrimination matter.
- Expert consultant on various other significant confidential labor economics matters in which there were class action allegations related to race, age and gender.
- Expert consultant for large insurance company related to litigation and potential regulation resulting from the use of credit scores in the insurance underwriting process.

**Testimony:**

- Testifying expert in Shirley Cohens v. William Henderson, Postmaster General, C.A 1:00CV-1834 (TFH) United States Postal Service. United States District Court for the District of Columbia.– Filed report re: lost wages and benefits.
- Testifying expert in Richard Akins v. NCR Corporation. Before the American Arbitration Association – Filed report re: lost wages.
- Testifying expert in Maureen Moriarty v. Dyson, Inc., Case No. 09 CV 2777, United States District Court for the Northern District of Illinois, Eastern Division. Filed expert report October 12, 2011. Deposition November 10, 2011.
- Testifying expert in Vincent Torbio, et al. against Feldor Billiards Inc. D/B/A Fatcat Billiards, et al., Index No. 153384/14, Supreme Court of the State of New York, County of New York. Filed expert report May 29, 2018. Deposition July 24, 2018.

Selected Experience in Antitrust, General Damages, and Other Matters:

- Expert consultant in high-profile antitrust matters in the computer and credit card industries.
- Expert consultant for plaintiffs in re: Brand Name Drugs Litigation. Responsible for managing, maintaining and analyzing data totaling over one billion records in one of the largest antitrust cases ever filed in the Federal Courts.
- Served as neutral expert for mediator (Judge Daniel Weinstein) in allocating a settlement in an antitrust matter.
- Expert consultant in Seminole County and Martin County absentee ballot litigation during disputed presidential election of 2000.



- Expert consultant for sub-prime lending institution to determine effect of alternative loan amortization and late fee policies on over 20,000 customers of a sub-prime lending institution. Case settled favorably at trial immediately after the testifying expert presented an analysis I developed showing fundamental flaws in opposing experts calculations.

#### **TEACHING EXPERIENCE:**

KNOX COLLEGE, Teaching Assistant - Statistics, (1995)  
KNOX COLLEGE, Tutor in Mathematics, (1992 - 1993)

#### **PUBLICATIONS:**

Coffman, Chad and Mary Gregson, "Railroad Construction and Land Value." *Journal of Real Estate and Finance*, 16:2, pp. 191-204 (1998).

Coffman, Chad, Tara O'Neil, and Brian Starr, Ed. Richard D. Kahlenberg, "An Empirical Analysis of the Impact of Legacy Preferences on Alumni Giving at Top Universities," *Affirmative Action for the Rich: Legacy Preferences in College Admissions*; pp. 101-121 (2010).

#### **PROFESSIONAL AFFILIATIONS:**

Associate Member CFA Society of Chicago  
Associate Member CFA Institute  
Phi Beta Kappa

#### **AWARDS:**

1994 Ford Fellowship Recipient for Summer Research.  
1993 Arnold Prize for Best Research Proposal.  
1995 Knox College Economics Department Award.

#### **PERSONAL ACTIVITIES:**

- Pro bono consulting for Cook County State's Attorney's Office.
- Pro bono consulting for Cook County Health & Hospitals System – Developed method for hospital to assess real-time patient level costs to assist in improving care for Cook County residents and prepare for implementation of Affordable Care Act.
- Pro bono consulting for Chicago Park District to analyze economic impact of park district assets and assist in developing strategic framework for decision-making.

## **Appendix C**

### **Description of Allergan Preferred Stock**

## The offering

*The summary below contains basic information about this offering. It does not contain all of the information you should consider in making your investment decision. You should read the entire prospectus supplement and the accompanying prospectus and the information included or incorporated and deemed to be incorporated by reference herein and therein, including the section entitled "Risk factors" included in this prospectus supplement and the consolidated financial statements and the accompanying notes incorporated by reference in this prospectus supplement, before making an investment decision. As used in this section, "we", "our" and "us" refer only to Actavis plc and not to its consolidated subsidiaries.*

<b>Issuer</b>	Actavis plc, an Irish public limited company.
<b>Securities Offered</b>	4,600,000 of our 5.500% Mandatory Convertible Preferred Shares, Series A, par value \$0.0001 per share.
<b>Public Offering Price</b>	\$1,000.00 per Mandatory Convertible Preferred Share.
<b>Overallotment Option</b>	We have granted the underwriters a 30-day option to purchase up to 460,000 additional Mandatory Convertible Preferred Shares solely to cover overallotments, if any, at the public offering price, less the underwriting discounts and commissions.
<b>Dividends</b>	<p>5.500% of the liquidation preference of \$1,000.00 per Mandatory Convertible Preferred Share per annum. Dividends shall accumulate from the most recent date as to which dividends shall have been paid or, if no dividends have been paid, from the first original issue date, whether or not in any dividend period or periods there have been funds legally available for the payment of such dividends, and, to the extent that we are legally permitted to pay dividends and our board of directors (which term, as used in this summary, includes an authorized committee of the board) declares a dividend with respect to the Mandatory Convertible Preferred Shares, we will pay such dividend in cash or, subject to certain limitations, in our ordinary shares or by delivery of any combination of cash and our ordinary shares, as determined by us in our sole discretion, on each dividend payment date; provided that any undeclared or unpaid dividends will continue to accumulate. Dividends that are declared will be payable on the dividend payment dates to holders of record of the Mandatory Convertible Preferred Shares on the immediately preceding February 15, May 15, August 15 and November 15 (each a "record date"), whether or not such holders convert their shares, or such shares are automatically converted, after a record date and on or prior to the immediately succeeding dividend payment date. Assuming the initial issue date is March 2, 2015, the expected dividend payable on the first dividend payment date is \$13.60 per share. Each subsequent dividend is expected to be \$13.75 per share. See "Description of Mandatory Convertible Preferred Shares—Dividends".</p> <p>If we elect to make any payment of a declared dividend, or any portion thereof, in our ordinary shares, such shares shall be valued for such purpose at the average VWAP per ordinary share (as defined under "Description of Mandatory Convertible Preferred Shares—Method of Payment of Dividends") over the five</p>

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	<p>consecutive trading day period beginning on and including the seventh scheduled trading day prior to the applicable dividend payment date (the "average price"), multiplied by 97%. In no event will the number of our ordinary shares delivered in connection with any declared dividend, including any declared dividend payable in connection with a conversion, exceed a number equal to the total dividend payment divided by \$100.80, which amount represents 35% of the initial price (as defined below) (subject to adjustment in a manner inversely proportional to any anti-dilution adjustment to each fixed conversion rate as described below) (such dollar amount, as adjusted, the "floor price"). To the extent that the amount of the declared dividend exceeds the product of the number of our ordinary shares delivered in connection with such declared dividend and 97% of the average price, we will, if we are legally able to do so, declare and pay such excess amount in cash.</p> <p>The "initial price" is \$288.00, which equals the per share public offering price of our ordinary shares in the Ordinary Shares Offering.</p> <p>Under Irish law, our board of directors (or an authorized committee) may only declare and pay cash dividends on the Mandatory Convertible Preferred Shares out of our "distributable reserves." While as of December 31, 2014 we did not have distributable reserves, we have filed a petition with the Irish High Court to confirm the creation of approximately \$5.79 billion of distributable reserves by decreasing our share premium account. We have undertaken to the underwriters to use reasonable best efforts to create distributable reserves if the Irish High Court declines our petition. If distributable reserves are not created, we may deliver ordinary shares instead of cash to satisfy our obligations under the Mandatory Convertible Preferred Shares.</p>
<b>Dividend Payment Dates</b>	<p>March 1, June 1, September 1 and December 1 of each year, commencing on June 1, 2015 and to, and including, the mandatory conversion date.</p>
<b>Acquisition Termination Redemption</b>	<p>If the Acquisition has not closed on or before 5:00 p.m. (New York City time) on November 30, 2015, the Merger Agreement is terminated or if we determine in our reasonable judgment that the Acquisition will not occur, we may, at our option, give notice of acquisition termination redemption to the holders of the Mandatory Convertible Preferred Shares. If we provide such notice, then, on the acquisition termination redemption date (as defined herein), we will be required to redeem the Mandatory Convertible Preferred Shares, in whole but not in part, at a redemption amount per Mandatory Convertible Preferred Share equal to the acquisition termination make-whole amount described herein.</p> <p>If redeemed, we will pay the acquisition termination make-whole amount in cash unless the acquisition termination share price described herein is greater than the initial price. If the acquisition termination share price is greater than the initial price, we will pay the acquisition termination make-whole amount in ordinary shares and cash, unless we elect, subject to certain limitations, to pay</p>

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	<p>cash or ordinary shares in lieu of such amounts. See “Description of Mandatory Convertible Preferred Shares—Acquisition termination redemption.”</p> <p>Other than pursuant to the provisions described in this prospectus supplement, the Mandatory Convertible Preferred Shares will not be redeemable by us. See “Description of Mandatory Convertible Preferred Shares—Acquisition termination redemption.”</p>
<b>Mandatory Conversion Date</b>	March 1, 2018.
<b>Mandatory Conversion</b>	<p>On the mandatory conversion date, each Mandatory Convertible Preferred Share, unless previously converted, will automatically convert into our ordinary shares based on the conversion rate.</p> <p>If we declare a dividend for the dividend period ending on the mandatory conversion date, we will pay such dividend to the holders of record as of the immediately preceding record date, as described above. If, prior to the mandatory conversion date, we have not declared all or any portion of the accumulated dividends on the Mandatory Convertible Preferred Shares, the conversion rate will be adjusted so that holders receive an additional number of our ordinary shares equal to the amount of such undeclared, accumulated and unpaid dividends (such amount, the “additional conversion amount”) divided by the greater of the floor price and 97% of the average price. To the extent that the additional conversion amount exceeds the product of the number of additional shares and 97% of the average price, we will, if we are legally able to do so, declare and pay such excess amount in cash pro rata to the holders of the Mandatory Convertible Preferred Shares.</p>
<b>Conversion Rate</b>	<p>The conversion rate for each Mandatory Convertible Preferred Share will be not more than 3.4722 of our ordinary shares and not less than 2.8345 of our ordinary shares (the “minimum conversion rate”), depending on the applicable market value of our ordinary shares, and subject to certain anti-dilution adjustments. The “applicable market value” of our ordinary shares is the average VWAP per ordinary share over the 20 consecutive trading day period beginning on and including the 22nd scheduled trading day immediately preceding the mandatory conversion date.</p> <p>The conversion rate will be calculated as described under “Description of Mandatory Convertible Preferred Shares—Mandatory conversion”, and the following table illustrates the conversion rate per Mandatory Convertible Preferred Share, subject to certain anti-dilution adjustments.</p>

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Applicable market value of our ordinary shares	Conversion rate (number of our ordinary shares to be received upon mandatory conversion of each Mandatory Convertible Preferred Share)
Greater than \$352.80 (which is the threshold appreciation price)	2.8345 shares (approximately equal to \$1,000.00 divided by the threshold appreciation price).
Equal to or less than \$352.80 but greater than or equal to \$288.00	Between 2.8345 and 3.4722 shares, determined by dividing \$1,000.00 by the applicable market value of our ordinary shares.
Less than \$288.00 (which is the initial price)	3.4722 shares (approximately equal to \$1,000.00 divided by the initial price).

**Conversion at the Option of the Holder** At any time prior to March 1, 2018, other than during a fundamental change conversion period (as defined below), holders of the Mandatory Convertible Preferred Shares may elect to convert their Mandatory Convertible Preferred Shares in whole or in part (but in no event less than one Mandatory Convertible Preferred Share), into our ordinary shares at the minimum conversion rate of 2.8345 ordinary shares per Mandatory Convertible Preferred Share ("early conversion") as described under "Description of Mandatory Convertible Preferred Shares—Conversion at the option of the holder". The minimum conversion rate is subject to certain anti-dilution adjustments.

If, as of the effective date of any early conversion (the "early conversion date"), we have not declared all or any portion of the accumulated dividends for all dividend periods ending on a dividend payment date prior to such early conversion date, the conversion rate for such early conversion will be adjusted so that holders converting their Mandatory Convertible Preferred Shares at such time receive an additional number of our ordinary shares equal to such amount of undeclared, accumulated and unpaid dividends for such prior dividend periods, divided by the greater of the floor price and the average VWAP per ordinary share over the 20 consecutive trading day period commencing on and including the 22nd scheduled trading day immediately preceding the early conversion date (the "early conversion average price"). To the extent that the cash amount of the undeclared, accumulated and unpaid dividends for all dividend periods ending on a dividend payment date prior to the relevant early conversion date exceeds the value of the product of the number of additional shares added to the conversion rate and the early conversion average price, we will not have any obligation to pay the shortfall in cash.

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**Conversion at the Option of the Holder  
Upon Fundamental Change;  
Fundamental Change Dividend  
Make-Whole Amount**

If a “fundamental change” (as defined under “Description of Mandatory Convertible Preferred Shares—Conversion at the option of the holder upon fundamental change; fundamental change dividend make-whole amount”) occurs on or prior to March 1, 2018, holders of the Mandatory Convertible Preferred Shares will have the right to convert their Mandatory Convertible Preferred Shares, in whole or in part (but in no event less than one Mandatory Convertible Preferred Share), into ordinary shares at the “fundamental change conversion rate” during the period (the “fundamental change conversion period”) beginning on the effective date of such fundamental change (the “fundamental change effective date”) and ending on the date that is 20 calendar days after the fundamental change effective date (or, if earlier, the mandatory conversion date). The fundamental change conversion rate will be determined based on the fundamental change effective date and the price paid or deemed paid per ordinary share in the transaction resulting in such fundamental change (the “fundamental change share price”).

Holders who convert their Mandatory Convertible Preferred Shares within the fundamental change conversion period will also receive a “fundamental change dividend make-whole amount”, in cash or in our ordinary shares or any combination thereof, equal to the present value (computed using a discount rate of 2.75% per annum) of all remaining dividend payments on their Mandatory Convertible Preferred Shares (excluding any accumulated dividend amount (as defined under “Description of Mandatory Convertible Preferred Shares—Conversion at the option of the holder upon fundamental change; fundamental change dividend make-whole amount—Fundamental change dividend make-whole amount and accumulated dividend amount”) and declared dividends for a dividend period during which the fundamental change effective date falls) from such fundamental change effective date to, but excluding, the mandatory conversion date. If we elect to pay the fundamental change dividend make-whole amount in our ordinary shares in lieu of cash, the number of our ordinary shares that we will deliver will equal (x) the fundamental change dividend make-whole amount divided by (y) the greater of the floor price and 97% of the fundamental change share price.

In addition, to the extent that the accumulated dividend amount exists as of the fundamental change effective date, holders who convert their Mandatory Convertible Preferred Shares within the fundamental change conversion period will be entitled to receive such accumulated dividend amount in cash (to the extent we are legally permitted to do so) or our ordinary shares or any combination thereof, at our election, upon conversion. If we elect to pay the accumulated dividend amount in our ordinary shares in lieu of cash, the number of our ordinary shares that we will deliver will equal (x) the accumulated

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<b>Anti-Dilution Adjustments</b>	<p>dividend amount divided by (y) the greater of the floor price and 97% of the fundamental change share price. To the extent that the fundamental change dividend make-whole amount or the accumulated dividend amount or any portion thereof paid in our ordinary shares exceeds the product of the number of additional shares we deliver in respect thereof and 97% of the fundamental change share price, we will, if we are legally able to do so, declare and pay such excess amount in cash. See "Description of Mandatory Convertible Preferred Shares—Conversion at the option of the holder upon fundamental change; Fundamental change dividend make-whole amount".</p> <p>The conversion rate may be adjusted in the event of, among other things: (1) dividends or distributions of ordinary shares; (2) certain issuances of ordinary share rights or warrants to purchase our ordinary shares at less than the current market price; (3) subdivisions or combinations of our ordinary shares; (4) certain distributions of evidences of our indebtedness, shares of our share capital, securities, rights to acquire shares of our share capital, cash or other assets, including share capital of subsidiaries or other business units in spin-offs; (5) dividends or other distributions consisting exclusively of cash other than in connection with certain reorganization events, a voluntary or involuntary liquidation, dissolution or winding up, or a tender or exchange offer; and (6) certain self-tender or exchange offers for our ordinary shares. See "Description of Mandatory Convertible Preferred Shares—Anti-dilution adjustments".</p>
<b>Liquidation Preference</b>	\$1,000.00 per Mandatory Convertible Preferred Share.
<b>Voting Rights</b>	<p>Except as specifically required by Irish law or our Amended and Restated Memorandum and Articles of Association ("Articles") or the extract resolutions of the board of directors, or an authorized committee thereof, of Actavis plc setting forth the terms of the Mandatory Convertible Preferred Shares (the "Designations"), the holders of Mandatory Convertible Preferred Shares will have no voting rights.</p> <p>Whenever dividends on the Mandatory Convertible Preferred Shares (i) have not been declared and paid, or (ii) have been declared but a sum of cash or number of our ordinary shares sufficient to discharge our obligations in respect thereof has not been set aside for the benefit of the holders thereof on the applicable record date, for the equivalent of six or more dividend periods, whether or not consecutive, the authorized number of directors on our board of directors will, at the next annual meeting of shareholders or at a special meeting of shareholders, automatically be increased by two and the holders of the Mandatory Convertible Preferred Shares, voting together as a single class with holders of any and all other series of voting preferred shares then outstanding, will be entitled, at our next annual meeting or at a special meeting of shareholders, to elect two directors to fill such newly created directorships created thereby, subject to certain limitations.</p> <p>We will not, without the affirmative vote or consent of holders of at least two-thirds of the outstanding Mandatory Convertible Preferred Shares and all other series of voting preferred shares entitled to vote thereon, voting together as a</p>



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single class (1) amend or alter the provisions of our Articles or the Designations so as to authorize or create, or increase the authorized amount of, any specific class or series of senior shares (as defined below); (2) amend, alter or repeal the provisions of our Articles or the Designations so as to adversely affect the special rights, preferences, privileges or voting powers of the Mandatory Convertible Preferred Shares; or (3) consummate a binding share exchange or reclassification involving the Mandatory Convertible Preferred Shares or a merger or consolidation of us with another entity, unless in each case the Mandatory Convertible Preferred Shares remain outstanding or, in the case of any such merger or consolidation with respect to which we are not the surviving or resulting entity, are replaced by preferred shares of the surviving or resulting entity, and the Mandatory Convertible Preferred Shares that remain outstanding or such preferred shares, as the case may be, have terms, taken as a whole, not materially less favorable to holders, in each case subject to certain exceptions. For more information about voting rights, see "Description of Mandatory Convertible Preferred Shares—Voting rights".

Certain matters, such as increasing the amount of authorized but unissued preferred shares or the issuance of additional Mandatory Convertible Preferred Shares or additional preferred shares of a class or series of parity shares (as defined below) or junior shares (as defined below), will not require the affirmative vote of holders of Mandatory Convertible Preferred Shares. For more information, see "Description of Mandatory Convertible Preferred Shares—Voting rights" and "Risk factors—Risks relating to the Mandatory Convertible Preferred Shares and Ordinary Shares—You will have no voting rights except under limited circumstances."

**Ranking**

The Mandatory Convertible Preferred Shares will rank with respect to dividend rights and distribution rights upon our liquidation, winding-up or dissolution:

- senior to our ordinary shares and each class or series of our share capital established in the future unless the terms of such shares expressly provide that they will rank senior to, or on parity with, the Mandatory Convertible Preferred Shares ("junior shares");
- on parity with each class or series of our share capital established in the future the terms of which expressly provide that they will rank on parity with the Mandatory Convertible Preferred Shares ("parity shares");
- junior to each class or series of our share capital established in the future the terms of which expressly provide that they will rank senior to the Mandatory Convertible Preferred Shares ("senior shares"); and
- junior to our existing and future indebtedness.

For information concerning the ranking of the Mandatory Convertible Preferred Shares, see "Description of Mandatory Convertible Preferred Shares—Ranking".

As of December 31, 2014, we had a total of approximately \$15.5 billion of outstanding indebtedness and, on an as-adjusted basis after giving effect to the

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	<p>proposed Debt Financing, other than the Cash Bridge Facility, and the Acquisition, would have had approximately \$45.2 billion of outstanding indebtedness, in each case including long-term debt and short-term debt. We have the ability to, and may incur, additional indebtedness in the future.</p>
<b>Use of Proceeds</b>	<p>We estimate that the net proceeds to us from this offering, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, will be approximately \$4,480,888,800 (or approximately \$4,929,677,680 if the underwriters exercise their overallotment option in full).</p> <p>We expect to use the net proceeds of this offering, together with the net proceeds of the Ordinary Shares Offering and the proposed Debt Financing, to finance the Cash Consideration Portion of the purchase price for the Acquisition and to pay related fees and expenses. In the event that we do not consummate the Acquisition on or prior to November 30, 2015 or the Agreement is terminated at any time prior to such date, then we expect to use the net proceeds from this offering to redeem the Mandatory Convertible Preferred Shares as described under "Description of Mandatory Convertible Preferred Shares—Acquisition termination redemption."</p>
<b>Certain United States Federal Income Tax Considerations</b>	<p>The material United States federal income tax consequences of purchasing, owning and disposing of the Mandatory Convertible Preferred Shares and any ordinary shares received upon conversion are described in "Certain United States federal income tax considerations."</p>
<b>Certain Irish Tax Considerations</b>	<p>The material Irish tax consequences of purchasing, owning and disposing of the Mandatory Convertible Preferred Shares and any ordinary shares received upon conversion are described in "Certain Irish tax considerations." Affected holders of the Mandatory Convertible Preferred Shares may take actions so Irish dividend withholding tax is not withheld from dividends, as described in "Certain Irish tax considerations—Withholding tax on dividends (DWT)."</p>
<b>Listing</b>	<p>We intend to apply to have the Mandatory Convertible Preferred Shares listed on the NYSE under the symbol "ACTPRA". Our ordinary shares are listed on the NYSE under the symbol "ACT".</p>
<b>Concurrent Ordinary Shares Offering</b>	<p>Concurrently with this offering, we are offering, by means of a separate prospectus supplement, 13,194,445 of our ordinary shares, plus up to an additional 1,319,444 of our ordinary shares that the underwriters of such offering have the option to purchase from us solely to cover overallotments, if any, in each case, at the actual public offering price of \$288.00 per ordinary share in connection with the financing of the Acquisition.</p>
<b>Transfer Agent and Registrar</b>	<p>Computershare Trust Company, N.A. is the transfer agent and registrar for the Mandatory Convertible Preferred Shares.</p>

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**Payment and Settlement**

The Mandatory Convertible Preferred Shares are expected to be delivered against payment on March 2, 2015. The Mandatory Convertible Preferred Shares will be registered in the name of a nominee of Depository Trust Company ("DTC") in New York, New York. In general, beneficial ownership interests in the Mandatory Convertible Preferred Shares will be shown on, and transfers of these beneficial ownership interests will be effected only through, records maintained by DTC and its direct and indirect participants.

Immediately after the consummation of this offering, we will have 4,600,000 Mandatory Convertible Preferred Shares issued and outstanding (or 5,060,000 if the underwriters exercise their over-allotment option in full). Immediately after the completion of the Ordinary Shares Offering, we will have 279.5 million of our ordinary shares issued and outstanding. The number of our ordinary shares outstanding immediately after the Ordinary Shares Offering that appears in the preceding sentence is based on 266.3 million of our ordinary shares outstanding as of February 24, 2015 plus 13,194,445 of our ordinary shares that we are offering pursuant to the Ordinary Shares Offering, but excluding:

- 1,319,444 of our ordinary shares issuable on the exercise of the underwriters' over-allotment option in the Ordinary Shares Offering;
- the estimated issuance of 110 million ordinary shares in the Ordinary Shares Offering to pay the aggregate Stock Consideration Portion of the Acquisition;
- up to 13,038,700 of our ordinary shares (up to 14,342,570 of our ordinary shares if the underwriters in this offering exercise their over-allotment option in full), in each case assuming mandatory conversion based on an applicable market value of our ordinary shares greater than the threshold appreciation price of the Mandatory Convertible Preferred Shares of \$352.80 and subject to anti-dilution, make-whole and other adjustments, that would be issuable upon conversion of Mandatory Convertible Preferred Shares issued in this offering; and
- an aggregate of approximately 15.2 million of our ordinary shares reserved for issuance under our various share compensation plans as of December 31, 2014.

**Risk factors**

See "Risk factors" beginning on page S-25 of this prospectus supplement and page 8 of the accompanying prospectus for a discussion of factors to which you should refer and carefully consider prior to making an investment in the Mandatory Convertible Preferred Shares.